COMPUTERWORLD

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Accounting stages a comeback with a spate of rollouts. Page 27.

Jobs III: Next wins early fans

BY JULIE PITTA
CW STAFF

SAN FRANCISCO — A college dropout last week unveiled what may be the most innovative workstation yet for the university market.

Steve Jobs, who was instrumental in developing the Apple Computer, Inc. Apple II and Macintosh computers, ended three years of anticipation when his company, Next, Inc., introduced the Next Computer System. The black-magnesium-housed unit is a Motorola, Inc. 68030-based workstation running the Unix operating system.

On a stark stage in an auditorium here, Jobs spent nearly two

AT&T counterattacks on Unix

Leads gang of System V backers in surprise bid to unseat OSF standard

BY AMY CORTESE
CW STAFF

In an unforeseen move to counter the Open Software Foundation, AT&T and several Unix System V licensees are expected to issue a joint announcement tomorrow supporting AT&T's Unix System V and detailing plans to form a rival group of System V backers.

AT&T is also expected to announce that it is creating a Unix software group separate from its hardware operations to centralize control of System V outside its Data Systems Group.

The move marks an abrupt shift in the negotiations between AT&T and the OSF, which had progressed to the point two weeks ago at which AT&T was considered a hairbreadth away from joining the OSF.

While the talks have not broken off, AT&T is now requiring as a condition of its membership that System V be substituted for IBM's AIX as the OSF's core operating system technology. The System V issue remains the major obstacle to an agreement.

Both sides said they are still talking, but AT&T membership in the OSF seems less likely today than it did a short while ago. In meetings held last week at OSF's headquarters in Lawrence, Mass., high-level representatives from both camps presented their analyses of the technical merits of the respective Unix versions — AIX and System V. Predictably, the AT&T camp praised System V and OSF officials lauded AIX, according to a source who attended the meeting.

"The kernel of Unix has to be System V, Release 4. That is the

The debate intensifies
AT&T will establish a rival Unix group after failing to come to terms with OSF

Open Software Foundation sponsors

AT&T System V users group

Apollo · Bull · DEC
HP · IBM · Nixdorf
Siemens · Philips
Hitachi

Sun · Amdahl · Gould
Prime · ICL · Unisys
NCR · Fujitsu · CDC
Olivetti

CW CHART

Shortcutting net guesswork

BY ELISABETH HORWITT
CW STAFF

UNIONDALE, N.Y. — Attendees at last week's Communications Managers Association conference were cautiously enthusiastic about a new breed of simulation and modeling tools that promise to help them come up with hard numbers for proposed network installations.

Recently announced simulation tools from IBM, Network Equipment Technologies, Inc. and Make Systems, Inc. reportedly allow users to perform what-if analyses in order to evaluate network response time, failure rates and costs. Such offerings could be used to either design a network from scratch or try out the effect of network changes before actually making them, vendors said.

"Network simulation tools would be absolutely invaluable to us, particularly if they showed the cost of building something and then having to tear it down," said Anthony Mattera, CMA president and manager of network planning at Prodigy Services Co. "I just went through a budget crunch period and wish I had had them."

However, Mattera expressed concern that such products would present a "garbage-in, garbage-out" problem. "The hu-

WALL STREET REBUILDS

The harsh lessons of Black Monday

BY ALAN J. RYAN
and JEAN S. BOZMAN
CW STAFF

One year ago this week, the world's attention was riveted on Wall Street, where the Dow Jones industrial average was suffering the most devastating beating in its history. As computer systems exceeded their capacities and trade orders backed up, information about what was happening on the trading floors virtually stopped. The market went into a free-fall.

By noon, the New York Stock Exchange had traded more shares than on any other day in its history, with four hours still to go. As stock prices continued to slide, computerized program trades added to the burden by sending sell orders for baskets of stocks that had reached a minimum price threshold. When the market closed, the Dow Jones industrial average stood 508 points lower than it had the previous Friday, and fears of a modern-day Great Depression ran rampant.

It has been a year of healing for Wall Street. Computer systems, which took much of the blame for the Crash of '87, have been built up, broken down, poked, prodded and pushed to the breaking point.

With new computers and communications networks in place today, officials contend, what happened to the systems a year ago cannot happen again.

One reason computers created a bottleneck last year was that the trading came in bursts, rather than in a steady

Crash echoes

IN THIS ISSUE

DEC masks price hikes . . . Restructured hardware support program will wind up costing users an estimated additional 6% to 9%. Page 14.

. . . as DG trumpets freebies. New MV/40000 models now sport the added perk of a year's free maintenance. Page 19.

Sidetracked by software? Page 97.

Inmate tattles on fed prison pirate program

BY MICHAEL ALEXANDER
CW STAFF

Adam Starchild figured his criminal career had ended when he was convicted of mail fraud and sent to the Federal Correctional Institution in Danbury, Conn., in August 1986. But for nearly a year, he was directed by officials at the U.S. penitentiary to break the law instead of rocks, Starchild alleged in a recent telephone interview.

According to Starchild, he made as many as 100 illegal duplicates of copyrighted Apple Computer, Inc. Apple II-compatible software for use within the correctional institution, for other institutions and for the personal use of prison staff members. All of the software that he copied, Starchild said, was intended for use by inmates in the prison's adult education program.

Prison officials acknowledged that inmates and staff members are copying microcomputer software and that the practice continues. But they deny doing anything illegal, claiming that they are merely doing what the documentation supplied with some programs licenses them to do.

Spilling the beans
Starchild, who was an adult education literacy instructor at the prison, said that from October 1986 to August 1987, he made copies of software published by Claris Corp., Minnesota Educational Computing Corp. (MECC) and other companies. He said that he duplicated these programs using unlicensed copies of Copy II and Disk Muncher, two popular programs that enable users to back up copy-protected software.

He said he expressed to prison officials his concern about the legal problems stemming from duplicating copyrighted software. "I pointed out the literature citing availability of a site license from MECC, for example, but [prison staff in the adult education program] told me that they did not need to buy it," Starchild recalled.

"I was outraged at the moral point of governmental criminality vs. rehabilitation," he said. "My being made to copy disks defeats the purpose of rehabilitation."

Starchild is serving a four-year sentence for mail fraud. He had ordered a variety of products, including computer software, by mail but did not pay for them.

The inmate expressed his outrage in letters to the editor of *Computerworld* and *The News-Times,* a Danbury newspaper, which published his letter July 3.

"Much of the software [that was copied] came from the very same companies that I was accused of defrauding by ordering software on credit and not paying the bills," he wrote. "Who is the greater criminal?"

Starchild's letter in *The News-Times* triggered an internal investigation into his allegations on July 5.

"There was copying but it was not illegal," said Craig Apker, executive assistant to the warden and public information officer at the Federal Correctional Institution in Danbury. "We checked with the company that published the software and they said it was not a violation of their copyright."

Prison staff concluded that no crime had been committed after reading the documentation of some of the programs in which it was indicated that making backups or working copies of certain programs was permissible and not an infringement on the copyright holder.

Claris, mentioned by Starchild as one of the companies whose software he claimed to have copied, was unavailable for comment.

They didn't ask
But at least one company, MECC, said it had not been contacted by prison officials nor did it condone unlicensed copying of its software.

"MECC offers site licenses to purchasers of its software, largely school systems, and that site license allows software buyers to make a proscribed number of copies," said Dale LaFrienz, president of MECC. "The Danbury Correctional Institution, unless it is part of the Danbury school system, which I seriously doubt, does not have a site license."

The company states in its documentation that making copies is not permissible, the opening screens of its programs contain copyright notices, and its disks are copy protected.

Apker readily admitted that the institution continues to make copies of software.

"My understanding is that making copies is OK and that there is nothing illegal about it," Apker said. "We have not been infringing on anybody's copyright and are looking at it when we are not sure. We have enough staff members that know enough to check it out if they are unsure."

Starchild, meanwhile, is serving the remainder of his sentence in food service at the U.S. Penitentiary in Sandstone, Minn.

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Calma deal roots Prime in CAD/CAM

BY WILLIAM BRANDEL
CW STAFF

NATICK, Mass. — Prime Computer, Inc. jumped deeper into the CAD/CAM/CAE market last week when it signed a definitive agreement to acquire General Electric Co.'s Calma division for an undisclosed amount.

The acquisition locks in Prime's hold on the No. 3 position in the computer-aided design, manufacturing and engineering market, according to International Data Corp. (IDC), a Framingham, Mass.-based market research group.

IDC estimates the buyout will give Prime another 2% of the CAD/CAM/CAE market on top of the 11% percent it already holds.

Top of the market

IDC reported that Calma pulled in $133 million in CAD/CAM/CAE sales last year, with Prime logging $744 million. IBM and Digital Equipment Corp. are No. 1 and No. 2, respectively, in the market.

A Prime spokesman said the deal tightens relations between Prime's engineering group and GE's corporate research laboratory. But he emphasized that the timing of the purchase of a GE subsidiary and the replacement of Prime President Joe Henson by GE's Anthony Craig [CW, Oct. 10] were totally coincidental.

"They didn't need a GE executive to buy Calma — GE hung up the for-sale sign over a year ago," said David Wu, vice-president of S.G. Warburg U.S.A, Inc., a Wall Street brokerage firm.

Questionable digestion

Wu said Prime will be forced to purge some of its own or Calma's overlapping software product lines. He also questioned Prime's ability to digest Calma, as it is still reorienting itself after the $435 million Computervision Corp. acquisition earlier this year.

The Prime spokesman acknowledged that some of Calma will be discarded but added that it would be "very slowly integrated into Prime."

Prime said it plans to continue to sell and service Calma's products as well as deliver Calma's announced product enhancements.

The deal, which will be subject to government review, is expected to be completed by mid-January 1989, according to Prime spokesmen.

Disaster recovery in IBM future?

BY JAMES DALY
CW STAFF

Reports that IBM may enter the rapidly emerging disaster recovery business continued to buzz through the industry last week, and although the firm would neither confirm nor deny the talk, it was uncharacteristically open to the speculation.

"We would not rule it out," said a spokesman for the Armonk, N.Y.-based giant when asked about the possibility of an impending general availability service. "Although we do not have an across-the-board disaster recovery offering, we've always bent over backwards to help our customers on an individual basis with disaster recovery planning through our publications and classroom training."

Rumors that IBM was hatching plans to enter the lucrative field began circulating a week earlier when Soundview Financial Corp. said IBM had sent out feelers to several large customers asking them if they would be interested in such a service.

Under most disaster recovery arrangements, companies essentially buy an insurance policy that guarantees them space on a backup computer at a nearby hot site should their machines be immobilized by fire, flood or any other calamity. Regular monthly fees for the service can run as high as $50,000, depending on the level of service.

What? Us, compete?

A spokesman for Sungard Data Systems, Inc., a current market leader, said it plans to meet with IBM in the next few weeks to discuss joint disaster recovery-related ventures, but IBM assured that company that it has no immediate plans to become a Sungard competitor. However, when Sungard asked IBM to sign a statement to that effect, the industry giant refused.

Some observers have said that IBM would take a different approach from firms like Comdisco, Inc. and Sungard if it entered the disaster recovery field. Ray Hipp, president of Comdisco's disaster recovery service, said he has heard reports that IBM is working on a fiber-based electronic vaulting technology, whereby a computer automatically sends copies of its data to a machine at another site.

Although the technology would not directly compete with Comdisco or Sungard, it would leave the door open for possible entry at a future date.

The disaster recovery field is certainly ripe for picking. Richard Tarbox, vice-president of corporate development at Wayne, Pa.-based Sungard, estimated that the disaster recovery arena is now a $500 million market that is only about 25% penetrated. Additionally, Sungard sales, about half of which come from disaster recovery, nearly doubled in five years to total $91.1 million in 1987.

Rosemont, Ill.-based Comdisco, which receives most of its revenue from computer leasing, estimated that disaster recovery revenue will go from $60 million in the fiscal year ended Sept. 30 to more than $100 million next year.

Well-publicized calamities such as a fire at a telephone switching station in suburban Chicago in May that knocked out more than 150,000 computer-to-computer connections [CW, May 16] have also helped to fuel user interest in the disaster recovery field.

Microsoft wins more LAN Manager backers

BY STEPHEN JONES
CW STAFF

BURLINGAME, Calif. — Microsoft Corp. chalked up more support for its OS/2 LAN Manager last week, clarifying its relationship with Digital Equipment Corp. and announcing the availability of the first OEM product based on LAN Manager.
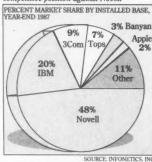
At its Network Systems Forum here, 3Com Corp. announced early shipment of its 3+Open LAN Manager, a network operating system built on LAN Manager. 3Com also unveiled two network management programs designed to provide network administrators on LAN Manager with advanced resource planning and security capabilities.

3+Open LAN View, which costs $495 per server, and 3+Open LAN Secure, which sells for $995 per network, will be available in the first quarter of 1989, a 3Com official said. Both products take advantage of LAN Manager's interprocess communication, called "Named Pipes," that shuttle communications between applications.

While IBM currently does not support such Named Pipes with its upcoming LAN Server, 3Com Chief Executive William Krause said he believes IBM might soon change its position on supporting the critical networking feature. "IBM prefers to be right rather than consistent," Krause said.

Beyond the 3Com rollouts, which were expected [CW, Oct. 10], LAN Manager also received a boost from DEC, which said it is finalizing its plans to license the OS/2 LAN Manager technology. DEC's plans call for LAN Manager protocols and interfaces to be implemented under its VAX/VMS Services — greasing a migration path from the desk top to DEC minicomputers and applications.

Microsoft also received an unexpected vote of confidence from X/Open Consortium Ltd., an organization of international computer vendors that publishes specifications for the implementation and portability of Unix systems.

X/Open reported that it has licensed the specifications for the Unix version of LAN Manager — or LAN Manager/X — for possible publication of both the system's protocols and applications-programming interfaces. The LAN Manger/X product is being co-developed by Microsoft and Hewlett-Packard Co.

The license agreement could mean that X/Open would support LAN Manager/X as a Unix industry standard, but one observer said the announcement was far from a ringing endorsement on the part of X/Open and that standardization talks are still under way between the organization and Microsoft.

LAN Manager also received a boost from the retail side. Egghead Discount Software, Inc. announced that it will sell, market and support 3Com's 3+Open LAN Manager through retail and direct corporate sales.

On the offensive
3Com has signed on to Microsoft's LAN Manager in hopes of improving its competitive position against Novell

PERCENT MARKET SHARE BY INSTALLED BASE, YEAR-END 1987

- 9% 3Com
- 7% Tops
- 3% Banyan
- Apple 2%
- 20% IBM
- 11% Other
- 48% Novell

SOURCE: INFONETICS, INC.
CW CHART

NEWS SHORTS

Sun raises prices across the board

Sun Microsystems, Inc. last week hiked prices on its workstations and servers by an average of 7%, blaming increases in the price of memory components. Prices for Sun's newer products have increased by an average of 6%, while prices for older systems have been boosted by between 10% and 15%. Additionally, Sun raised prices for add-on memory by $100 per megabyte. This is the second time Sun has increased prices because of the scarcity of dynamic random-access memory components. Last spring, Sun raised the prices of products based on Motorola, Inc. microprocessors.

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ADR acquisition a done deal

Barely a month after the deal was announced, Computer Associates International, Inc. said last week it has completed its $170 million acquisition of Applied Data Research, Inc. (ADR) from Ameritech. "In the next week or so, we'll have a lot more to say about what we are doing" with the new unit, said David Tory, executive vice-president at CA. Tory suggested that research and development spending at ADR might be cut and that overspending on development was one cause of ADR's reported unprofitability.

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Cadnetix resists suitor

The stage is set for the computer-aided design and manufacturing industry's second hostile takeover battle of the year. Cadnetix Corp. strongly urged its shareholders last week to reject Daisy Systems Corp.'s $8 per share tender offer [CW, Oct. 10]. Boulder, Colo.-based Cadnetix also went to court to seek validation of its defensive shareholder rights plan and an injunction against Daisy's attempt to consummate the tender offer. Daisy currently owns 7.6% of Cadnetix. If successful, the takeover could put Daisy among the top 10 CAD/CAM vendors.

. . . .

What's in a name?

Maybe a lot, judging from Arthur Andersen & Co.'s decision last week to give its consulting practice a new name, Andersen Consulting. The move serves to differentiate the company's auditing and management consulting functions, spokesmen said. It also may set the stage for a move by Arthur Andersen to separate its consulting and auditing practices. The company would not comment on the speculation but said it has already launched "a major study to consider all options available in restructuring the practice."

Many of the nation's Big Eight accounting firms have been facing a strain between the auditing and consulting practices. Earlier this year, the consulting arm of Chicago-based Arthur Young was torn apart when senior partners broke away to form Technology Solutions Co. [CW, June 20].

. . . .

Thanks for the memories

Japan's leading semiconductor makers plan to raise their prices for 1M-bit dynamic random-access memory (DRAM) chips soon, according to Japanese press reports. Fujitsu Ltd., Mitsubishi Electric Corp. and Toshiba Corp. are among the companies planning to raise prices from the $14.62 to $17.69 level this month to the $15.38 to $17.69 per chip level for large-volume customers. Even though production of 1M-bit DRAMs was boosted in July, suppliers expect the tight supply-and-demand situation to continue for a while.

. . . .

GE sheds another unit

General Electric Co. demonstrated last week that it is eager to sell off information systems subsidiaries. Shortly after announcing that Prime Computer, Inc. will buy its Calma subsidiary (see story page 4) GE sold its Digital Video Interactive Technology Venture (DVI) facility to Intel Corp. Intel gains the Princeton, N.J.-based facility's 35-person development team from the deal as well as DVI's proprietary digital compression and decompression technology, patents and hardware and software products. DVI's products are used for interactive, full-motion video and audio capability in personal computers and consumer electronics.

Compaq laptop lives three-hour battery life

BY JULIE PITTA
CW STAFF

HOUSTON — Compaq Computer Corp. today will introduce an Intel Corp. 80286-based laptop computer that is able to operate on batteries for an estimated three hours.

The computer, scheduled to be introduced at a press conference in New York, is one of a number of new entries this month in the resurgent laptop market. Other models have recently been introduced by NEC Information Systems, Inc., Toshiba America Corp. and Grid Systems, Inc. A laptop announcement is also expected shortly from IBM.

According to Computer Intelligence, a San Diego market research firm, Toshiba and Zenith Data Systems are the market share leaders in that arena.

Industry analysts have said these systems are growing in popularity for corporations with field personnel because of their portability and relatively low price.

"You have to give Toshiba a lot of credit for demonstrating that the market is there," said William Zachmann, president of Canopus Research, a computer industry research firm in Duxbury, Mass. "That's money that Compaq has been leaving on the table. It's safe to say they'll get their share of it now."

The long-expected Compaq entry, called the SLT/286, weighs 14 pounds and measures 13½- by 8½- by 4-in. It runs at a 12-MHz clock speed and offers 640K bytes of random-access memory, expandable to 3.6M bytes.

The laptop also features two expansion slots. The 10-in. flat-panel display is backlit and offers 640- by 480-pixel IBM Video Graphics Array resolution.

The system is powered by a battery pack said to provide an estimated three hours of use. An AC adapter is also standard.

The SLT/286 will be offered in two versions, one with a 40M-byte hard drive priced at $5,999 and a second with a 20M-byte hard drive priced at $5,399.

It's a laptop

Compaq's long-awaited portable runs for three hours on rechargeable batteries

Compaq SLT/286

Processor	12-MHz Intel 80C286
Memory	640K bytes, expandable to 3.6M bytes
Display	Backlit LCD, 640- by 480-pixel resolution
Storage	1.44M-byte diskette drive; 20M- or 40M-byte hard disk drive
Size	4 x 13½ x 8½ in.
Weight	14 pounds
Price	$5,399 (Model 20), $5,999 (Model 40)

CW CHART

AT&T

sticking point," said Robert M. Kavner, president of AT&T's Data Systems Group, in an interview with *Computerworld* last week. AT&T, along with 10 other companies now shipping Unix System V systems, will form a group to counter the influence of OSF, he said.

Kavner indicated that keeping System V intact was a demand coming from its prospective users group. "That is what the 11 companies are insisting on for them to join [OSF]," Kavner said. Kavner would not identify other members but suggested several vendors as candidates for such a group: Amdahl Corp., Unisys Corp., Control Data Corp., NCR Corp., Ing. C. Olivetti & Co., Fujitsu America, Inc., ICL Ltd., Gould, Inc., Sun Microsystems, Inc. and Prime Computer, Inc.

All of the companies have built multiyear development programs around System V and would have to invest millions of dollars to retrofit systems to a new standard such as IBM's AIX version of Unix, according to Kavner. "What they worry about is that if OSF adopts AIX, and the world goes to AIX, they'll be left behind — or

they're going to have to put a ton of money to get themselves on AIX," he said.

In a subsequent teleconference last Thursday originating in Summit, N.J., AT&T called for a show of support from nearly 25 of its licensees and software vendors. Kavner asked the licensees to participate in a joint announcement Tuesday stating support for AT&T's Unix System V as the industry-standard version of Unix as well as the for-

RALF-FINN HESTOFT/PICTURE GROUP
Kavner: *'If we're all going to follow OSF, shouldn't we all be satisfied that we've got the world's best making this decision?'*

mation of a rival group backing Unix System V.

The move led by AT&T to stand behind System V is admittedly a little late, Kavner conceded. "I don't think we've done a good public relations campaign in understanding what OSF really is," Kavner told *Computerworld* last week.

Kavner said he objected to

the process of the OSF's deliberations even more than he did to the conclusions the OSF eventually draws.

"We are handing some people an incredibly important decision," Kavner said. "If we're all going to follow OSF, shouldn't we all be satisfied that we've got the world's best making this decision? They are moving so quickly that I am concerned about the quality of this decision they're making."

For example, he said, OSF has accepted 23 submissions for the OSF system's graphical user interface, including AT&T's own Open Look interface. Kavner is concerned that Open Look gets thorough consideration. Kavner said he also wants to be assured that the consideration process is an honest one.

Like many users, Gary Biddle, vice-president of information systems at American Standard, Inc., expressed impatience with the progress towards a single Unix standard.

"Two years is forever," he said. When faced with a business problem, American Standard's policy is to go ahead with what is available and not wait for a standard, he said.

Midwest Bureau Chief Jean S. Bozman and Senior Writer William Brandel contributed to this report.

IBM hops aboard the Next train

BY J. A. SAVAGE
CW STAFF

IBM grabbed a piece of Steve Jobs' limelight last week and at the same time raised questions about its own intentions for its workstation line.

Just four days after announcing that its AIX operating system for the Personal System/2 line would be delayed five months, IBM said it would license Next, Inc.'s graphical interface and add it to AIX.

Nextstep, application-development and end-user interface software, will be available on IBM's PS/2, RT, 370 and future reduced instruction set computing systems, according to Bill Filip, IBM's assistant general manager of personal systems. No date has been set for product availability, according to an IBM spokesman.

Nextstep has four parts: Window Server, which manages on-screen image drawing; Application Kit, with predefined objects to replace subroutines in application development; Objective-C, an object-oriented version of C code that can be used to design additional objects for the applica-

tion kit; Interface Builder, which uses the objects in the Application Kit to structure the application's interface; and Workspace Manager, which shields users from Unix commands with menus and icons.

How to tell them?
IBM will now face the quandary of explaining to users the difference between the Next interface and IBM and Microsoft Corp.'s OS/2 Presentation Manager interface set for shipment later this month. Presentation Manager will run on the PS/2 line, but IBM has never committed itself to implementing it on AIX.

But while there may be some initial confusion, there is little overlap between the two systems, said Adrian King, director of product marketing for operating systems at Microsoft.

King said AIX is aimed at government and education bids, while Presentation Manager is meant for more general productivity applications. He added that Presentation Manager will be the basis for IBM's Systems Application Architecture interface.

Users, however, may turn blue holding their breath before a product is available. IBM appears to be having problems shipping its own Unix systems, even without the addition from Next. IBM said earlier this month that it will delay initial shipments of its AIX PS/2 operating system until March 1989.

Senior Editor Douglas Barney contributed to this report.

SQL Server bundled with Next

BY DOUGLAS BARNEY
CW STAFF

High-flying Sybase, Inc. has stuck another feather in its cap in the form of a bundling deal that gives Next, Inc. users a free copy of SQL Server with every machine they purchase.

If Next attacks the commercial market, the bundling deal may cut some of the muscle out of Sybase's deal with Microsoft Corp. and Ashton-Tate Corp. to resell an OS/2 version of the same database engine.

There will be some competition for the hardware and operating systems sales between the Next and OS/2 versions, Sybase

President Mark Hoffman said. But most shops have already decided on a hardware platform and will not make the switch because of a bundling deal, Hoffman said.

Not equal yet
In addition, the version of SQL Server bundled with the Next machine supports fewer users and networks than the OS/2 version. Once the Next version is upgraded and given parity with the OS/2 version, the price will be increased and will be similar to the OS/2 version, Hoffman said.

Microsoft downplayed the SQL Server competition from

Next. According to Adrian King, director of product marketing for operating systems at Microsoft, the decision to buy a Next machine instead of an Intel Corp. 80386-based machine for OS/2 will come down to the overall selection of applications, not just SQL Server.

No matter what way people choose to go, there should be some measure of compatibility between the two products, according to King. "There will be overlap in the sense that [Next] is licensing the same technology. But, at least applications-wise, there will be a lot of compatibility between the products," he said.

Mach getting up to speed

BY WILLIAM BRANDEL
CW STAFF

The Mach operating system on Next, Inc.'s workstation may have made its debut playing a desktop role, but its capabilities will be exploited in a grand fashion when Evans & Sutherland Computer Corp. raises the curtain on its next supercomputer.

Evans & Sutherland will introduce a $5 million multipro-

cessing supercomputer based on the Mach operating system in mid-1989, said Vice-President of Marketing Bob Stevenson. He said Mach, which is based on the University of California at Berkeley's Unix 4.3, has extensions that allow high-end graphics applications to be processed on a specified processor in the supercomputer.

Carnegie-Mellon University's computer science department has developed and is shepherding Mach, which consists of a rewritten kernel inside the Unix external interface. The system may open application doors previously barred to Unix,

as it brings multiprocessing capabilities and memory management to Unix's sometimes loose processing structure.

Mach is also reportedly 15% to 30% faster than standard versions of Unix because of its tighter degree of organization, said Rick Rashid, director of the Mach program at Carnegie-Mellon. He said that Mach easily outperformed Sun Microsystems, Inc.'s SunOS 3.5, Digital Equipment Corp.'s Ultrix-32 and IBM's ACIS in benchmark tests.

Mach also brings additional virtual memory management that is useful in high-end graphics applications.

Jobs

hours last Wednesday demonstrating the computer to an audience of about 3,000 veterans jaded from many other "revolutionary" introductions. Afterward, many voiced high praise for the machine.

Applause was stored in the system and replayed to showcase the system's sound capabilities. An animated black-hole icon

served as the system's equivalent to the Macintosh's trash can icon. Using a mouse, a file was sent to the black hole, which then rotated, closed and disposed of the file. A jack in the back of the base accommodates miniature stereo earphones.

"It's a very impressive machine," said Richard Edwards, an analyst at Robertson, Colman & Stephens in San Francisco.

However, Edwards said Next may have erred by not using the popular reduced instruction set

computing architecture, which offers better price/performance for future systems; by failing to detail a networking strategy; and by creating its own windowing system rather than adopting a standard such as X Windows.

"Most Unix-based software developers will write for X Windows," Edwards said.

The price is right
Perhaps the loudest applause came at the announcement of the Next workstation's entry-level price of $6,500.

But Jobs then quickly delivered what attendees said was the biggest letdown of the day. The only way to get a Next workstation — as Jobs put it — is to "enroll" in a university.

The system, which is scheduled to begin shipping next month, will be sold directly to colleges. Universities may in turn resell it to students, although it is unlikely that many students will be able to afford the system. The machine will likely find a home in research branches of large or well-funded schools.

Next was mysteriously secretive about the machine, cordoning it off behind rope barriers and permitting only one photographer in the auditorium. Reporters were later allowed to borrow photos of the computer,

Next, Inc.'s *personal computer, three years in the making*

but no views of the screen were offered.

In an interview after the press conference, Jobs insisted that universities can afford the system, although public institutions are especially hampered by tight budgets. "I think you'll see a lot of these machines in state institutions," he said. "We've done our homework."

Few believe that Jobs will limit Next to the university market. The new Steve Jobs who emerged after nearly three years of being out of the limelight appeared to be a more savvy businessman than the brash Jobs of the Apple era. He discarded the boasts of the past and seemed unwilling to set grandiose goals.

"More companies tend to die of indigestion than of starvation," he said. "We will remain tightly focused."

If Next does indeed branch out into commercial markets, as industry watchers expect it will, the system represents stiff competition for Jobs' earlier brainchild, the Macintosh, and for Sun Microsystems, Inc. products.

Officials at both companies downplayed the potential competition.

"We like innovative technology; we're all for it," an Apple spokeswoman said. "And as a company, we wish Steve well. But we're confident in our technology. We're not standing still."

Marlene McDaniels, director of marketing for Sun's education line, called the Next machine "a very good machine. But we didn't think it's particularly revolutionary. These are technologies that Sun is using. We're not standing still either."

For students only?
Next's computer system approaches high-end workstation power for the price of a fully loaded PC

Processor	25-MHz Motorola 68030 and 68882 floating-point processors; 10-MIPS Motorola 56001 Digital Signal Processor
Memory	8M bytes, expandable to 16M bytes
Storage	256M-byte removable erasable optical disk, optional 300M- or 660M-byte hard disk
Display	17-in. monochrome monitor, 1,120- by 832-pixel resolution
Operating system	Unix-based Mach
Bundled applications	Word processing; symbolic mathematics; database; LISP language; personal text database manager; electronic mail with integrated voice mail
Price	$6,500

CW CHART

Biin aims first products at fed market

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Biin, the international computer systems company formed by Intel Corp. and Siemens AG in July, has set its sights on the U.S. government market with a proprietary computer architecture that emphasizes fault tolerance, security and the Ada programming language.

Last week, Biin (rhymes with fine) unveiled the first two systems in its product family as well as its federal marketing effort and an alliance with Relational Technology, Inc., whose Ingres database management system will be integrated with Biin's architecture.

However, Biin did not announce any applications software for the new systems. The company said it is working on a number of alliances with OEM companies for vertical-market applications.

Although Biin is aiming initially at the U.S. government and European factory automation markets, other potential markets include financial services, on-line transaction processing, manufacturing, telecommunications and health care, officials said.

Biin had to announce commercially available products before it became eligible to bid on U.S. government contracts. Company officials indicated they expect to pursue business in defense-related work initially.

Biin's competitors include such major players as IBM, Digital Equipment Corp., Tandem Computers, Inc. and Stratus Computer, Inc. But Joseph J. Kroger, former Unisys Corp. executive and now president of Biin, said Biin will have a competitive edge because its systems offer built-in security, adjustable levels of fault tolerance and lower prices due to manufacturing efficiencies.

Because Biin is the product of a five-year research effort by Intel and Siemens, Kroger called the joint venture a mature start-up that has 300 employees, expenditures of $150 million and an international network of service technicians from its parent companies.

Bucking the trend

In an interview, Kroger acknowledged that coming out with a proprietary architecture runs counter to the trend toward open systems, but he stressed that Biin's architecture has interfaces to AT&T's Unix System V and the IEEE Posix standard for applications portability.

Although the operating system is proprietary, Biin/OS has a Unix shell that will allow software vendors to port their Unix applications software to it, said Adam Cuhney, an analyst at Kidder, Peabody &

Biin's Joseph J. Kroger

Co. in San Francisco. "The hardware is there, but you've got to convince the software writers they should port to you vs. someone else," he added.

Biin announced two systems, the entry-level Biin 20 and the high-end Biin 60, and claimed that they have better price/performance ratios than DEC's Microvax 3500 and VAX 8840, respectively.

The Biin 60 can be configured with two to eight processors with performance of 11 million instructions per second to 44 MIPS and was designed to support about 1,000 terminals. The system, available immediately, is priced from $345,500 to $815,000.

The Biin 20 is a deskside or desktop package with one or two processors that was designed to support 50 terminals and has a performance range of 4.5 to 9 MIPS, the vendor said. The price is $43,500 to $75,000, and volume shipments are expected in March 1989.

The key to Biin's 32-bit multiprocessor architecture is that many functions typically found in systems software are embedded in the very large-scale integrated chips provided by Intel, officials said. Key features of the architecture include the following:

- All systems in the product line can run the same programs.
- Systems administrators can use software commands to select three levels of fault tolerance in order to achieve desired performance levels.
- Multilevel security is provided with access controls for users and hardware-enforced controls for programs. Biin said it expects to get a C-2 security rating from the government's National Computer Security Center early next year.
- The Biin/OS operating system and utilities are implemented in about two million lines of Ada code.

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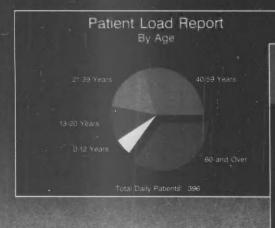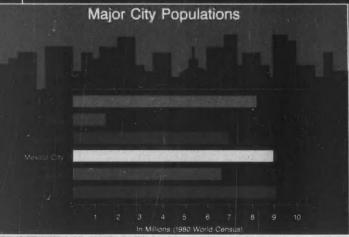
Sales Boom

Patient Load Report
By Age

21-39 Years   40-59 Years

13-20 Years

0-12 Years   60 and Over

Total Daily Patients: 396

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Technical Writing   Communication Design

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The SAS System has integrated applications to use "as is" or customize to fit your needs. Plus a built-in micro-to-host link just for your PC.

Read data in any format from any file including dBASE and Lotus 1-2-3. Then analyze and display your data through interactive windows.

Major City Populations

Mexico City

1 2 3 4 5 6 7 8 9 10

In Millions (1980 World Census)

Want a free warranty? Don't go to DEC

Revamped support program eradicates freebies, effectively hoists hardware prices 6% to 9%

BY JAMES DALY
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. effectively raised its prices by an average of 6% to 9% last week when it announced a gutted and rebuilt warranty program that eliminates a free year of maintenance service.

The warranty changes are effective immediately and will be expanded to DEC's international market next year.

John Buckley, DEC's manager of U.S. sales administration, said the company had originally toyed with the idea of raising prices across the board but opted for the warranty action because "it does give the customer some choices."

A price increase may also have soured users, who absorbed a 3.5% price increase in June that DEC attributed to the rising cost of dynamic random-access memory chips.

The Columbus dodge

DEC downplayed its decision to abandon the formerly highly touted program, slipping the announcement under the door during the Columbus Day holiday and labeling the development a move to let customers choose "their appropriate level of product support."

Under the new plan, warranties are available in four forms: list-price, basic, standard and optimum. Services under the new options are broken down as follows:

• The List Price Warranty is included with all systems and was primarily designed for customers prepared to handle the lion's share of their maintenance. Free service is available to customers who bring their computers to DEC service locations.

• The Basic Warranty is a nine-hour-a-day, five-day-a-week plan that includes access to DEC's software information database, the right to use new versions of DEC's software, on-site software support, full hardware installation, 24-hour telephone support and a four-hour response time.

• The Standard Warranty, which DEC is pushing the hardest, essentially soups up the previous free one-year warranty. The Standard Warranty services are identical to the Basic Warranty with the exception of offering 24-hour-a-day, seven-day-a-week on-site support and a two-hour response time.

• The Optimum Support Warranty includes all the features of the Standard Warranty and throws in a professional support engineer for six months and a performance optimization service to provide performance upgrades.

Because of the changes, users can expect to dig deeper into their pockets to obtain the equivalent level of service protection that was offered earlier at no charge. A four-user Microvax 2000 that had sold for $18,800, for example, will now be available for $20,000 with the Standard Warranty. Buyers of the high-end Microvax 8840 systems, on the other hand, should start hunting around for an extra $100,000 to cover the cost of Standard Warranty protection for the $1.3 million system.

DEC said it expects 60% to 70% of its customers to choose the Standard Warranty coverage and 10% to 15% to take advantage of the free List Price Warranty.

Early bird gets the warranty

Although the new arrangement goes into effect immediately, orders placed before the announcement will enjoy whatever warranty was provided at the time of sale.

Analysts reacted favorably to the move, noting that the free warranty was begun 18 months ago to squeeze out third-party maintenance competition and was no longer financially feasible.

"Customers must face the fact that they are either going to pay maintenance costs up front or vendors will tack it on to the product price," said Barry Bosak, a securities analyst at New York-based Eberstadt Fleming investment firm.

Others argued that the price increases are extreme because computers have become increasingly reliable in recent years and the need for service has been reduced. "I think it's outrageous," commented Scott Magoon, director of academic and research computing at Brandeis University in Waltham, Mass. "Their high maintenance costs have already forced other departments in this university to go with other vendors, like Hewlett-Packard."

Ironically, as DEC scaled back on its included warranty offerings, fellow Massachusetts organization Data General Corp. added product support muscle to its recently announced high-end MV/40000 and MV/40000-High Availability processor line with the addition of a comprehensive one-year support package for the machines and their related family of products (see story page 19).

DEC also said it will increase prices of add-on software and hardware by 2%.

Hurry-up-and-wait mentality strikes again with 1-2-3

BY MICHAEL ALEXANDER
CW STAFF

CAMBRIDGE, Mass. — While Lotus Development Corp. executives scrambled last week to explain why 1-2-3 Release 3.0 would be delayed by as much as six months, users by and large said they are still willing to wait.

At a hastily called Columbus Day press conference, Lotus executives conceded that they had overestimated the enormity of the task of developing the product.

W. Frank King, senior vice-president of the software products group at Lotus, said the job of developing Release 3.0 turned out to be "an order of magnitude" greater than designing Release 2.01, the current version of the product. Lotus developers have written some 330,000 lines of code in C language for Release 3.0, compared with about 100,000 lines for Release 2.0 written in assembler, he said.

Jim Manzi *is confident Lotus can hit its latest ship date*

Lotus executives stressed that the second-quarter target to ship the new release is firm and one they are certain can be attained. Jim P. Manzi, president and chief executive officer, added, "We're saying that we're not going to get together in this room again."

King said much of the difficulty lay in writing Release 3.0 so that it is portable across five operating systems — IBM and Microsoft Corp.'s OS/2, Microsoft's MS-DOS, IBM MVS, VM and Unix — while still maintaining compatibility with previous versions of the best-selling spreadsheet.

The timetable for other versions of the product — 1-2-3/G, a graphics version of

> " ONE OF THE biggest opportunities we've blown [for a graphical version of 1-2-3] was in the Macintosh market. But in our core market, the IBM DOS market, we would not change places with anybody."
>
> JIM MANZI

1-2-3, and 1-2-3/M, which Lotus is developing with IBM for mainframes — is uncertain, although Release 3.0 will provide the core for those and other products, company officials said.

The mainframe version will be ready for testing five to six weeks after Release 3.0 is available; "then it's up to IBM to do its own testing," King said.

Later, Manzi admitted that "one of the biggest opportunities we've blown [for a graphical version of 1-2-3] was in the Macintosh market. But in our core market, the IBM DOS market, we would not change places with anybody."

Manzi and King appeared confident that the delay will not have a long-term impact on sales of Release 3.0. While some large customers expressed disappointment over the delay, most are willing to wait, the executives said.

Several large buyers of 1-2-3 confirmed that view.

The delay is not going to affect the work of most of the more than 1,500 1-2-3 users at The Gillette Co. in Boston, said Greg Chetel, director of systems planning and research. "Most of our users are not pushing the limits of the existing product, and we do not see the delay as a big enough event to consider switching to an alternative like Excel," he said.

Investors were less patient, however. On the day of the press conference, Lotus stock fell by 7/8 of a point to close at 15 7/8 on 2.3 million shares traded.

Robert Schechter, Lotus' chief financial officer, said that the current upgrade program for new buyers of 1-2-3 Release 2.0 will be extended until Release 3.0 is shipped but declined to say how much the program will cost as a result of the delay.

DEC hooks up with CA lines

BY ROBERT MORAN
CW STAFF

NEW YORK — Digital Equipment Corp. took additional steps last week toward its goal of penetrating IBM-ruled data centers by signing a deal with Computer Associates International, Inc. to jointly develop and market versions of several CA products for the DEC VAX/VMS environment.

The formal agreement will offer DEC users the Garden City, N.Y.-based developer's systems management software and utilities and open a new and burgeoning market for CA.

Among the products that CA said it will integrate more closely into the VAX environment are CA-Netman/VAX (network configuration management), CA-Archiver (resource management), CA-Disspla and CA-Tellagraf (graphics), CA-Tellaplan (project management), CA-Strategem (decision support), Ad Lib (query/report writer) and the Masterpiece financial application series.

The company said the products have been moved under DEC's All-In-1 and that compatibility with DEC's RDB database management system will be added to Masterpiece. However, no pricing or availability date was given. In addition, a joint development team will join CA's Superimage, a graphics editing system, with DEC's Decwindows. Delivery of that product is scheduled for the first half of 1989.

On the growth path

DEC's mid-range market share has climbed steadily from approximately 13% in 1983 to 22% in 1987, according to Steven Widen, program director of Dectrack at TFS, Inc., a Westford, Mass.-based consultancy.

Such growth has enticed several other software developers to sign recent marketing deals with the minicomputer makers. DEC and Relational Technology, Inc. are expected to announce such an agreement this week.

The alliance will also help DEC penetrate large data centers, said Dale Kutnick, an independent consultant in Redding, Conn. Missing from DEC's offering has been the utilities that match the sophistication that IBM and third parties have brought to IBM environments.

DEC also introduced an easier-to-use Version 2.3 of its All-In-1 office system along with the Mailbus distributed directory service, which automatically locates recipients of mail on any size All-In-1 system or other X.400 systems as well as IBM's Professional Office System and Systems Network Architecture Distribution Services.

All-In-1 Version 2.3 will ship in the fourth quarter of 1988. Prices range from $7,088 to $112,219, depending on system configuration. Mailbus will also be available then, and the cost will depend on configurations.

FCC rules carriers must justify costs

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Federal Communications Commission gave business network managers a partial victory last week when it ruled that local carriers must provide better justification when they use above-cost pricing for high-capacity data services.

During a three-year FCC investigation of the "strategic pricing" issue, business groups such as the International Communications Association (ICA) charged that special-access rates for high-capacity voice and data services are grossly inflated [CW, Aug. 15].

The FCC ruled that strategic pricing is not unlawful because the carriers must have the flexibility to consider factors other than cost when setting special-access rates. However, the FCC said carriers must provide detailed justification for strategic pricing and demonstrate that it meets a set of six guidelines.
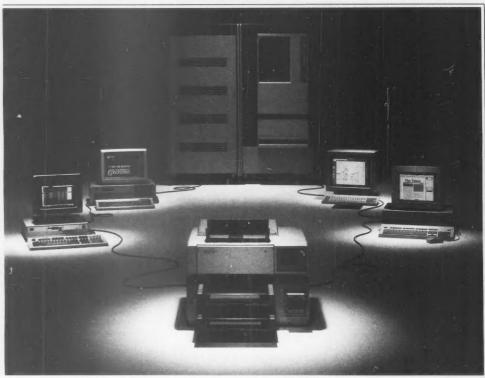
"We would have liked to have seen an up-or-down vote on the basic issue, but this is a step in the right direction," said Brian R. Moir, a counsel for the ICA. "We don't oppose flexibility, but we wanted some justification."

Only the right reasons

The FCC's guidelines stated that strategic pricing must advance a specific public policy goal — such as preventing uneconomic bypass of the public network — and must not hinder a customer's choice of access services, the implementation of new technologies or efficient use of the network.

Local exchange carriers said they use strategic pricing to discourage businesses from bypassing their single voice-grade circuits and moving to bundled, high-capacity services, the FCC said.

The commission postponed decisions on several issues until it gets more public comment. Those issues include whether past tariffs meet its new guidelines, whether users are due refunds and strategic pricing of Digital Data Service rates.

Software firms unite, aim to keelhaul pirates

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Six major software companies formed the Business Software Association (BSA) last week with the goal of fighting international software piracy and reducing trade barriers.

The organization provides formal structure for an ad hoc group of vendors that was instrumental in several raids against Hong Kong's Golden Shopping Arcade, one of the world's most notorious markets for illegally copied software. In the latest raid, in July, Hong Kong officials closed down several pirate software outlets.

The founding companies are Aldus Corp., Ashton-Tate Corp., Autodesk, Inc., Lotus Development Corp., Microsoft Corp. and Wordperfect Corp. The group, based here, selected attorney Douglas E. Phillips as president.

Phillips said formation of the BSA is a response to the enormous losses the software industry suffers from piracy and denial of market access. The U.S. International Trade Commission recently reported that 31 U.S. hardware and software firms lost $4.1 billion in 1986 due to foreign piracy.

World effort
In addition to fighting piracy in East Asian markets, BSA is expected to focus on ensuring that the software markets in Europe and Brazil are kept open to U.S. products.

Phillips said the BSA will lobby the U.S. and foreign governments, work with

> THE U.S. International Trade Commission recently reported that 31 U.S. hardware and software firms lost $4.1 billion in 1986 due to foreign piracy.

law enforcement agencies, pursue private lawsuits, conduct educational programs and work with existing trade associations.

For example, the BSA recently urged the European Commission, which is studying intellectual property rights in Europe, to provide full copyright protection for computer programs in a forthcoming directive.

Offshore only
Phillips said the BSA will not work on domestic piracy cases, leaving those to the Software Publishers Association (SPA) and ADAPSO, a computer software and services industry association.

BSA organizers denied that the formation of the new group is an implicit criticism of similar activities by the SPA and ADAPSO. They said the BSA will work closely with the two older associations in international affairs.

"It's just a difference in focus," said R. Duff Thompson, general counsel at Wordperfect in Orem, Utah. "Our goal is to keep the group small, with a focus that is narrow and intense."

Unmodified PS/2s overseas

BY CHRIS BROWN
IDG NEWS SERVICE

HONG KONG — IBM is selling unmodified versions of its latest Personal System/2 machines here that do not comply with U.S. Federal Communications Commission Class B specifications.

The firm was required to modify these machines in the U.S. to correct a poorly placed keyboard cable.

The FCC regulations do not apply in Hong Kong. However, in order to meet the regulatory board's rules, IBM has taped over the FCC specification stickers on the backs of all PS/2 Model 30 286s exported for sale here, according to Ray Gorman, a spokesman for IBM Asia/South Pacific.

No contact yet
Gorman also claimed that all IBM dealers and distributors have been told to inform customers that the machines do not comply with FCC regulations.
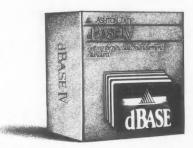
However, none of the IBM dealers contacted said they had heard from IBM on this matter. All of the dealers declined to be named.

One dealer said, "I got the stock only a couple days ago, but there's been nothing about this [FCC] at all."

At an unspecified date, IBM Asia/South Pacific plans to affix all Model 30 286s sold in Hong Kong with a device to make them FCC-compliant, according to Hal Jennings, marketing program manager at IBM Asia/South Pacific.

Masstor pits tape against disk storage

BY J. A. SAVAGE
CW STAFF

SANTA CLARA, Calif. — It may be blasphemous, but Masstor Systems Corp. says its new tape subsystems can compete with disk storage.

Two IBM-compatible tape storage systems, both using helical scan recording technology to pack in a terabyte of data per system, are being announced today by Masstor. One has a footprint smaller than a refrigerator's; the other's is the size of a moving van. Both are intended to take advantage of IBM's MVS/ESA Systems Managed Storage capability.

The M960 Mass Storage System, set to be available early next year, stores data on bullet-shaped cartridges about 3½ in.

ONE SYSTEM has a footprint smaller than a refrigerator's; the other's is the size of a moving van.

long. The system consists of a controller and a storage module for up to 316 tapes at 350M bytes per tape. An optional hardware data compression facility is available, compressing 700M bytes on each cartridge, according to the company. The system can accommodate up to eight storage modules.

Because of its 3M byte/sec. throughput, the M960, with support of 4.5M byte/sec. data-streaming channels, is considered on-line, according to Michael Beadsmoore, senior vice-president of Masstor's domestic operations.

Masstor doubled the capacity and throughput on the M960, compared with its last product, the M860. The bullet-shaped tapes have been in use by Masstor for a decade.

The second system, scheduled to be available late next year, should be able to store 31.25G bytes on a tape cartridge that is the size of a portable dictionary at an estimated cost of $1.25 per megabyte.

Masstor said the M1000 will also have to option of data compression, allowing twice as much data per tape — up to 2 terabytes per module — to be stored. With a single accessor arm, the M1000 will have a maximum access, load and unload time of 9.5 sec. per tape, according to the company.

Masstor officials said the company is announcing the M1000 a year ahead of shipping because of the current availability of IBM's MVS/ESA Systems Managed Storage and the resulting pressure to have storage that fits into a hierarchy of designated storage areas.

The M960 is expected to cost $700,000 for a basic controller and module, with the optional data compression costing another $125,000. The M1000 will cost about $1,300,000, according to Beadsmoore. No price has been set for the compression option.

DG adds support for MV/40000s

Extensive plan seen as jab at DEC's warranty price hikes

BY JAMES DALY
CW STAFF

MILFORD, Mass. — Data General Corp. added warranty muscle to its recently announced high-end Eclipse MV/40000 and MV/40000-High Availability processor line last week with the announcement of a comprehensive support package for the machines and related products.

The Warranty Service Contract adds ammunition to DG's arsenal in its war against competitor Digital Equipment Corp. The Maynard, Mass., giant began charging customers for a previously free one-year warranty program last week, effectively raising the prices of its machines 6% to 9%.

Under DG's plan, customers will be extended 24-hour, seven-day-a-week coverage. Coverage previously was limited to a nine-hour, five-day-a-week time frame.

Eight days a week

The coverage also includes round-the-clock remote assistance from DG's Customer Support Center (CSC) in Norcross, Ga. The CSC can then tap into an enhanced proprietary coresident diagnostic software package supplied to warranty customers that lets on-line remote diagnostics be run from the CSC without affecting processing, the firm said.

Additionally, an account support team will be assigned to each machine and will be available on a 24-hour basis.

DG also noted that the warranty is convertible to a Multiyear Plus agreement at any time during the warranty period. The Multiyear Plus program allows customer to obtain contract service in three-, four- and five-year terms.

The one-year warranty also applies to the Eclipse Message-Based Reliable Channel Subsystem, a subsystem for use on Eclipse MV systems, and the Eclipse Channel Subsystem.

PDN

X-25

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3270
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EDITORIAL

The Next step

THE QUESTION FOR Next, Inc. is this: Is the industry ready for yet another personal computer?

If history is any indication, it is — but with a catch. Next founder Steve Jobs will find that the market has changed a great deal since he played key roles in creating the Apple II and Macintosh standards.

In the Apple II's case, all that was required for success was an idea, a brilliant technical mind in the form of Steve Wozniak and a retail industry waiting to happen. In the case of the Mac, success required an entire division of Apple, three years of arduous post-release product tuning and refining and a major shake-up of company leadership, including the removal of Jobs himself.

For Next, the hurdles are even higher. There is no doubt that the machine the company unveiled last week is revolutionary in many respects. At a discounted price of $6,500, it comes with memory, storage, graphics and sound capabilities of machines more than double its cost.

But the industry is strewn with revolutionary ideas that never made it in the market. The Macintosh itself was a good example. At the time of its introduction, it was a quantum leap ahead of the available technology in ease of use and flexibility. But it wasn't until Apple added 384K bytes of additional memory and a DOS coprocessor board that business users accepted it.

The Mac was a machine that didn't know what its market was. The Apple II didn't care. Neither approach is good enough to win today, so Next has embarked on a strategy that seems to make a lot of sense.

The company is carving out a niche — universities and laboratories — in which it believes price sensitivity and a low degree of vendor loyalty can give it an edge. Next has also added another important element to the equation — money. Endowed with a virtual blank check from billionaire H. Ross Perot, $12 million of personal funding from Jobs and a legion of eager but unnamed investors, the company is approaching the market with resources to burn. Next should resist the stomping that less fortunate start-ups often suffer at the hands of the big boys.

But what will make or break Next will be its ability to rise above technological arrogance and respond quickly to customer needs. The company has taken a number of gambles with the Next computer; the machine is priced well above the means of most university students, it won't accept a floppy disk and it has no PC compatibility. Let history be a warning: Apple's stubbornness in the face of demands for expandability and IBM compatibility on the Macintosh nearly killed that product three years ago. Ironically, once Apple gave in and offered a PC compatibility option, the issue died and the option never sold.

It would be shortsighted to think that Next will limit its horizons to students and engineers. If the company is to become the billion-dollar giant it envisions itself to be, it must vie for the corporate market. The interest will be there, but only if Next is tough enough to compromise.

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LOTUS AIRLINES
FLIGHT NO: 1-2-3 RELEASE 3.0
DEPARTURE TIME:
DELAYED AGAIN STILL!

ONCE MORE

WELL FOLKS, FOR THOSE OF YOU WAITING FOR THE DEPARTURE OF FLIGHT 1-2-3, RELEASE 3.0, GUESS WHAT, ...

LETTERS TO THE EDITOR

Creativity matters

I must take exception to an article concerning "business etiquette consultant" Ada Barnett [CW, Aug. 15].

Barnett proposes many sensible solutions to problems encountered by high-level management and marketing personnel. But please keep her away from working engineers! The "Hawaiian-shirted and sandal-footed" engineers know that substance is more important than style in dealing with technical problems, and so do those listening to them.

If a company is to produce an innovative product, it must have some players who are allowed to express their creativity freely. Casting a pall of uniformity over an organization may make Barnett feel at home but does little to encourage creativity.

Jon Gersh
Senior Software Engineer
Envoy Corp.
Nashville

Too arrogant

Regarding "Form precedes function" [CW, Sept. 5], the user often knows exactly what he wants. Assuming that he doesn't know what he wants or needs is a form of intellectual arrogance that has no place in the business world.

It sounds to me like the chief architect should pick up the phone and ask some questions of those who do understand the business problem rather than spending his time trying to "replace the complex structure of interacting subsystems with linear arrays of standard types of components embedded in a foundation software framework."

Forman and Hess claim that

their rationale will reduce the complexity of the problem. I fail to see how the up-front development of anything and everything but the solution to a recognized problem makes the task simpler.

Template software has its place, but to attempt to generally apply such a development method seems unwise.

Joanne Pandolfo
Princeton, N. J.

Really needed?

The focus on Naomi Karten's article [CW, Aug. 22] is unclear. She says the need of the function provided by information centers is rapidly diminishing, yet she exhorts them to communicate their successes to management as a way of prolonging their existence.

When their need disappears, so does their raison d'etre, no matter how successful they have been. Instead of communicating their successes, they would be better advised to assume responsibility for more and more duties. In this way, they would defend themselves against both obsolescence and trends.

Ron Kelly
Marquette Heights, Ill.

Face the music

A recent letter [CW, Aug. 22] asked IBM to halt their plans for object code-only in the best interest of the software and user communities. I find the position taken to be quite naive.

IBM has been promising to withhold source code for several years now. They have delayed their implementation of this practice under pressure from software vendors and users but have not rescinded their position. They have increased the

number of exits available, improved their documentation and provided improved tools for obtaining specific pieces of information. They have now promised that they will work with software vendors to provide the information which is required. All of this has clearly pointed to the fact that they are going ahead with their plans to secure their software via object code-only.

As a responsible software company, we have been enhancing and improving our products, but always doing so with the recognition that all dependence on source code was at best tenuous. We have therefore taken the position that these dependencies will have to disappear.

Ira W. David
Senior Vice-President,
New Technology
On-Line Software
International, Inc.
Fort Lee, N.J.

Don't shy away

I don't fault the basic message of your editorial, "Playing with fire" [CW, Aug. 15]. However, I do take exception to your reasoning regarding punishment of offenders.

Ethics, values and a society that cares are needed. But realistically, we know that potential perpetrators of crimes are a part of the greater mix of society and always will be. A large corpora-

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Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Climbing castles of data

On your way to the top, don't forget it is information that supports you

EFREM MALLACH

Much has been made of the need for those in charge of MIS to broaden their focus to include nontechnical issues, to consider business needs, to become full-fledged members of the executive team.

But at the same time, there has been a less noticed revolution in what these managers should focus on within their departments.

One way to understand this revolution is to see how managerial titles have evolved.

In the prehistoric 1950s, these managers were called tab machine supervisors. By the '60s, they had become computer center managers, and in the '70s, they were directors of data processing.

Now in the 1980s, we have vice-president of information systems or even, once in a while, the chief information officer.

Upgrading titles can increase one's salary and status. But the new subject matter with which the manager deals is the more meaningful change, whether it is the equipment used, the data itself or the information that the data represents.

Changing titles, and duties, imposes new requirements on the head of MIS. Technical skills were sufficient to manage tab equipment. If one knew how to wire a plugboard and clear a card jam — skills now valued by museums — one was qualified. Other issues concerned other people.

The change to managing computers meant developing new technical skills. Physical skills, such as mounting tapes or (still) clearing card jams, became the domain of machine operators. Computer managers dealt with Cobol, product schedules and upgrade plans.

The next stage, responsibility for data processing, carried with it oversight of the data being processed. Data had to be input accurately, processed carefully and printed on time. The one who bore this responsibility was a bona fide senior manager.

Responsibility for information is fundamentally

different from all that preceded it. Information is the organization's lifeblood.

The value of equipment can be measured by its depreciated price tag. The value of data can be measured by the cost of capturing or creating it anew.

In both cases, the measured value may be high. But the value of information can be immeasurably higher. Indeed, it cannot really be calculated, since it depends on how the information is used.

Responsibility for the care of information is, therefore, far more significant than mere responsibility for the data that yields it or the machines that process it. And this responsibility is totally separate from the much-ballyhooed topics of "business issues" or becoming an executive "team player."

Responsibility for information means understanding what makes information "good" or "bad."

Making this distinction is as important as a tab machine supervisor knowing when a ribbon

BILL RUSSELL

needs replacing, a computer center manager knowing when increased work load calls for a processor upgrade or a DP director recognizing a database integrity problem.

It all adds up

There are seven basic determinants of information quality:

1. **Accuracy.** Given valid input data, accuracy is primarily a function of processing. At the information level, it is important to ensure that the conceptual model of the world, embodied in the computer programs, reflects the real world properly.

2. **Consistency.** Two items may be accurate individually but should not be used together because they are inconsistent.

For example, dividing annual sales by the size of the sales force on Dec. 31 may not yield meaningful sales productivity information if the sales force's size changed significantly during the year.

3. **Conformity to user definitions and expectations.** In figuring annual sales, how does one count returns that took place after the year ended? There are many possible ways. And the best choice for planning next year's styles may not be the right choice — or even a legal choice — for tax returns. The information systems leader who does not know what the users expect is taking a shot in the dark.

4. **Precision.** Precision is not accuracy. The statement, "The current temperature is 16.87344 degrees Fahrenheit" is quite precise, but — on a tropical July day — probably inaccurate. Too much precision can be as bad as too little: Who needs to read eight decimal places on a speedometer at 65 mph, even if all are accurate?

5. **Timeliness.** All other things equal, earlier is usually better. But all other things are seldom equal. How much earlier, how much better and with how much impact on other factors?

6. **Cost.** Many problems can be overcome by spending money, but check that what you are buying is what your users and department really need.

7. **Usability.** Three-dimensional graphs may clarify a relationship better than a book full of tables. *The Official Airline Guide* is an excellent example of the value of information usability. Its publishers take in enormous sums of money selling information that every airline is delighted to give away free. How? By making it more usable.

Some of the seven factors are visible: precision, timeliness, usability and some cost elements. *Continued on page 25*

Mallach is a faculty member at the University of Lowell and a consultant to user and vendor executives.

Ignore what I said before

When you make a presentation, give them words

NAOMI KARTEN

This article is a retraction. I followed my own advice, and it backfired. So, this column is about ignoring advice sometimes — or at least being as aware of where it won't work as where it will.

In a *Computerworld* column last year, I described problems with the computer-generated visuals that some people have used with presentations. Wordiness in text slides was one example I mentioned. Some crowd the slides with more words than the average person can read while listening to a speaker. "Too many visuals look like a test for 20/20 vision," I said.

Another problem I described was the poor design of pie charts, with too many parts and colors to the charts, to the point that they make no sense at all.

I suggested that speakers cut down on word and graphic slides and increase the use of pictorial or whimsical slides that make the point without needing to be read. I explained that I was sold on this approach ever since I gave a presentation two years ago using slides prepared by a creative graphic designer. As quickly as I explained the points I wanted to make, he came up with cartoons, drawings and clever ways to convey my message that were easier to comprehend and remember than tiny text, cryptic charts and multicolored glare.

Buoyed by my success with this approach, I used it frequently — until it backfired.

On that day, which was about six months ago, I gave a presentation to a group of MIS directors using a set of specially prepared slides. Some were whimsical, cartoon-like slides. Others were word slides but with the fewest possible number of words on each.

I wanted the audience to listen. I wanted the slides to support my talk — not dominate it. The speech went fine, I thought, but the written comments included some negative reactions to my slides. The gist was that it did not appear that much time had been spent preparing them.

This was not the case at all. I had carefully planned the message that each slide was to convey and had put quite a bit of effort into the design. But at least some people saw slides with pictures in areas they're used to seeing words; some saw very few words where they're used to seeing an overdose of words.

They concluded I must be lazy.

Clearly, laziness is in the mind of the beholder. Words come easily to me, and if I had prepared 20-word-per-line or 40-line-per-page text slides, then a charge of laziness might have been valid. But for me, conveying a message with pictures is hard work.

Furthermore, some of these slides were really good. The graphics specialist I worked with deserves the credit. He could see possibilities in areas that I couldn't, and he devised clever ways of getting the point across without resorting to words. He told me that most of his clients want their slides to contain the greatest possible word density that the technology will allow, even though the result is impossible to read.

At one time, I would have insisted that these people were wrong to want to pack their slides with words, but now I have to accept that maybe they're right at least some of the time.

This audience of MIS directors equated words with effort. Regardless of the words coming out of the speaker's mouth, if the slide did not contain words, it meant the speaker was lazy.

But there is another point. I think that these executives felt that at their level, pictures were beneath them. They were serious business professionals, and they wanted words!

Swamped with info

I also suspect that given the cost and duration of this forum, they wanted to feel they were being inundated with information, even if they couldn't absorb it.

I found evidence to support these views in some of the other sessions at this forum. The speakers in these sessions did, indeed, use complex, multimatrixed, word-intensive, information-packed slides.

I knew these speakers, and I had seen many of their slides. Even so, while listening to their words, I found it difficult to simultaneously absorb all the information in their slides.

But the audience didn't criticize the presentation. The slides looked informative and, apparently, that was value enough.

Courses in presentation skills frequently address the how-tos of computer-generated presentation visuals. These courses urge students to avoid wordiness. They caution against doing anything that makes the image complex to look at or difficult to comprehend. It's good, common sense. Unfortunately, simplicity and clarity can backfire.

Sometimes you have to confound people in order to impress them.

Karten is president of Karten Associates in Randolph, Mass.

Mallach

Some are not: accuracy, consistency, conformity to definitions and other cost elements.

Users tend to be realistic about visible information quality factors but wildly optimistic about invisible ones.

An information systems chief, however, cannot afford this overoptimism.

There are trade-offs among the seven factors. For example, a 3-D graph will cost more than a report in terms of equipment needed to create it, software packages to be bought, program-

Letters

tion may have numerous security guards and elaborate controls on physical access. If an illegal entry occurs in spite of these precautions, they aggressively and publicly strive to enforce punishment.

But does this same corporation place equal security measures on the extremely valuable and sensitive data residing in its information systems? Often, it does not. So when illegal entry is gained, rather than risk the attendant publicity regarding their vulnerability, the corporation drops the matter, quietly changes internal systems-entry procedures and hopes the problem will not reoccur.

Management must develop and maintain stringent security controls for information networks. When that is done, the corporation must vigorously and unapologetically pursue punishment for those evade the security precautions — regardless of the publicity.

Marshall H. Austin
Senior Consultant
Advanced Information
Management, Inc.
Woodbridge, Va.

Slant rant

The story "Bells ring hollow in information business" [CW, Aug. 1] gave a biased view of my company, Pactel Infosystems.

Who feels that Pactel "botched up" retail sales? Your reporter was editorializing, not reporting.

Our decision to rechannel our focus from retail outlets to direct sales was based directly on an assessment of our customers' needs. Our surveys showed that our target customers, medium and large businesses, overwhelmingly prefer to be served via a direct corporate sales force.

Michael M. MaKieve
President, Computer Division
Pactel Infosystems
Walnut Creek, Calif.

mer time and resource usage. It will also take more time to produce and will reduce potential precision.

The correct choice in making trade-offs depends on the value of the information at different points in the quality spectrum, which in turn depends on how the information is to be used.

The modern information systems manager must understand

T HE EXECUTIVE WHO spends time thinking great thoughts without first getting his or her own house in order is building castles in the air.
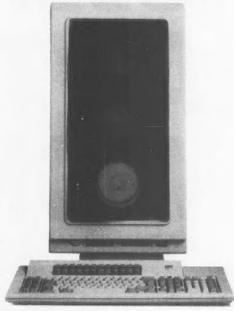
the nature of information, the factors that determine its quality and the trade-offs among these

factors in order to manage effectively.

Once these are mastered,

once the information systems function is under control, he or she can go on to plan strategic uses of information and become a full-fledged member of the inner executive circle.

But first things must come first. The executive who spends time thinking great thoughts without first getting his or her own house in order is building castles in the air.

SYSTEMS & SOFTWARE

What price normalization?

Despite a running debate over the virtues of data normalization, no one has done a quantified analysis of how much performance the practice of normalization costs.

The debate has been conducted on a basis of intellectual appeal and intuition. Normalization advocates point out the purity of data structure when data is decomposed into simple, more stable structures. Normalization has the effect of scattering numerous data sets across a given unit of physical storage.

Denormalization proponents point out the inefficiencies of processing that result from creating many small, physically separate pools of data. They advocate concentrating data in a common area of storage for optimum access.

In an attempt to resolve the dispute, George Coleman at Amdahl Corp. in Chicago conducted a large study that took a quantified look at normalization vs. denormalization.

The study was run on an Amdahl 5890-300E mainframe using three groups of transactions, each accomplishing the

Accounting lives!

Spate of rollouts invigorates market

BY AMY CORTESE
CW STAFF

The accounting software market isn't dead yet. A wave of product introductions in recent weeks has infused new technology into the aging market.

Financial accounting and other traditional back-office applications are increasingly viewed by executives as one more way to use information for strategic advantage, despite their image as tired workhorses.

The market has not been the most dynamic in the computer industry in recent years. But David Brownlee, president of Walker Interactive Systems in San Francisco, noted, "A market is only saturated until there is better technology available. Companies are always looking for a competitive edge."

Vendors are responding to this shift and positioning their products as mission-critical applications. New capabilities now allow financial management software to be an integral part of a company's information systems. A number of new and enhanced products introduced recently illustrate this trend.

Ross Systems, Inc. introduced last week its next generation of accounting software for the Digital Equipment Corp. VAX. Three weeks before, Oracle Corp. had launched a financial product line for the VAX, Sequent Computer Systems,

DB2 2.2 shows IBM is serious on distribution

BY STANLEY GIBSON
CW STAFF

IBM is serious about making real what some view as a computing nirvana — a distributed relational database within the guidelines of Systems Application Architecture (SAA). Although the company has previously talked of plans to offer such a system, the recent announcement of DB2 Version 2 Release 2 puts the firm's official seal on that intent.

The distributed capabilities that will be available with Release 2 will not be shipped until the third quarter of 1989, but that is additional indication that a long-range blueprint is being implemented, according to observers familiar with IBM's Santa Teresa, Calif., development effort.
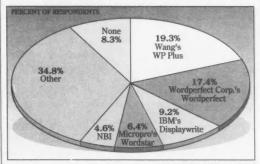
The announcement was made a year ahead of time because IBM is serious about distributed relational, and the company wants to give its customers time to plan, said a source with ties to the DB2 development group.

The source said users interested in distributing data will have to begin now — if they have not already — to implement the hardware and networking requirements of such a system. The requirements include multiple computers in different locations and an extremely powerful and reliable network.

Data View

Wang courts lawyers

A survey of 100 MIS directors found Wang to be the predominant supplier of word processing software to the legal market

PERCENT OF RESPONDENTS

- None 8.3%
- 19.3% Wang's WP Plus
- 34.8% Other
- 17.4% Wordperfect Corp.'s Wordperfect
- 9.2% IBM's Displaywrite
- 4.6% NBI
- 6.4% Micropro's Wordstar

SOURCE: THE SIERRA GROUP, INC.
CW CHART

Anticipating IBM's next five years

BY CHARLES BABCOCK
CW STAFF

IBM is going to move much of its software and, it hopes, its customer base under the Systems Application Architecture (SAA) umbrella in anticipation of freeing its clients from dependence on 370 family hardware and operating systems.

By doing so, it will allow its customers to take advantage of parallel processing and other new hardware technologies that are likely to dominate the mid-1990s, according to Michael Braude, vice-president of the Gartner Group, Inc. in Stamford, Conn.

These and other predictions were part of a recent airing of

Inside

- CASE researcher forms users group. Page 29.
- Star Technologies claims its CMOS processors notch 100 MFLOPS. Page 29.
- More database vendors enroll in Unix show's performance review. Page 29.

HARD TALK

Rosemary Hamilton

DG's image problem

No doubt about it: DG has an image problem.

The Data General announcement earlier this month shows that this company still knows how to come out with a good product.

From analysts and users alike came loud applause for the high-end MVs. But from those same supporters came words of concern about DG's ability to turn this into a winner.

Often, product alone doesn't carry a company to new heights of success. A firm also needs a good image to carry it. An image that says this company will be around for some time to come. An image that assures customers it is worth making a big investment in it. But these days, DG is perceived as a troubled minicomputer maker.

Its troubles are real. The financial problems DG has had are fact. But it keeps shooting itself in the foot trying to fix those problems. If the company could more effectively communicate what it's trying to do to cope with these problems, users and analysts who help shape industry opinion might give the company the chance it needs to turn things around.

Low-key rollout

At the MV/40000 press conference in New York earlier this month, one could almost feel the negative perception in the air. Here we had a company rolling out the highest performing system in its history, the new generation of its flagship product line. Traditionally, companies in such a situation put together a show-biz event, with special effects and long speeches by gung-ho executives.

But this event was a quiet one. Three speakers, including Edson de Castro, took about an hour to present the product. De Castro then offered a question-and-answer period, but fewer than 10 questions came from the audience. He then thanked the attendees for coming, and the event closed. There was none of the applause typical of a big product rollout.

Certainly a contributing factor to the solemn atmosphere was the news of more layoffs, which DG had announced just a few days before the big event. One analyst said the timing of *Continued on page 32*

CASE users group aims to rein in hype

BY NELL MARGOLIS
CW STAFF

When Case Research's first annual survey of the computer-aided software engineering (CASE) market turned up a surprisingly low level of actual CASE implementation at large commercial and industrial sites, the Bellevue, Wash.-based consultancy and market research firm decided to not just report on the situation but alter it.

The suggested remedy is a national association called CASE Users Group — the first organized forum for education and exchange among CASE users that is neither directly nor indirectly sponsored by a specific tool vendor, according to Case Research President Greg Boone.

"The gap between the realities of implementation and the hype about the technology is bigger than it's ever been, and more input from vendors is a far cry from what's needed to change that," Boone said.

Case Research — which, Boone said, is serving only as a necessary catalyst and plans to have no controlling role in the group once it is up and running — is starting small, with a Washington-based group that its organizers hope will become the Seattle-area chapter of a national organization. Such matters as dues, organizational structure and publications have yet to be decided.

Even in its fledgling state,

however, the idea is attracting users, many of whom see in CASE the same need for peer-to-peer communication — in the true sense of the phrase — that galvanized Case Research.

Users applaud

Users — current and prospective — who are helping to form the Seattle area chapter of the association saw the effort as a potentially viable way of addressing several of the fundamental problems that are proving to be roadblocks in the way of CASE. Looming large among such problems are product hype; confusion between tools, on one hand, and methods on the other; difficulties in identifying the ultimate CASE beneficiary; and lack of communication across technological and business boundaries.

Mark Smith, an engineer involved in software engineering research and development at Boeing Corp., said, "We run the risk of operating along an agenda of theirs, true — but at least it isn't that of one particular vendor." Vendor-sponsored users groups, Smith was quick to add, can be extremely helpful. "However," he said, "they're not very likely to expose you to users' experiences with other vendors' tools. Case Research is at least nominally independent."

The kind of user exchange that the new group hopes to foment, Smith said, could aid in abating another problem now rampant in the CASE area.
Continued on page 35

Star says CPUs notch 100 MFLOPS

STERLING, Va. — Star Technologies, Inc. recently rolled out its VP Series of 32-bit CMOS processors, which the firm claimed can operate at speeds of up to 100 million floating-point operations per second (MFLOPS).

The VP-2's dual computehead design provides up to 100 MFLOPS, while the VP-1's single head delivers 50 MFLOPS. The VP-1 is upgradable to the VP-2 with the addition of a second compute head.

The VP series also supports a 100M byte/sec. aggregate main memory bandwidth and three I/O channels operating at a maximum of 50M byte/sec. on the direct-memory access channel. These features allow the series to move and process data simultaneously, the firm said.

The VP-2 and VP-1 vector processor series are targeted toward real-time compute-intensive applications, including defense applications, radar and sonar processing, satellite imaging and seismic data processing.
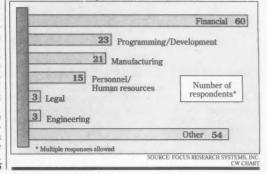
Star also claimed that the VP series can be connected to host machines that are offered by IBM, Digital Equipment Corp., Concurrent Computer Corp., Gould, Inc., Sun Microsystems, Inc. and Alliant Computer Systems, Inc. and can be simultaneously attached to three dissimilar hosts as shared computing resources.

The VP series is available within 90 days of receipt of order. The VP-2 sells for $95,000, while the VP-1 will go for $85,000.

Data View

AS/400 applications

Financial applications will be the most popular on IBM's Application System/400, according to 95 companies surveyed that intend to purchase the machine

Application	Number of respondents*
Financial	60
Programming/Development	23
Manufacturing	21
Personnel/Human resources	15
Legal	3
Engineering	3
Other	54

* Multiple responses allowed

SOURCE: FOCUS RESEARCH SYSTEMS, INC.
CW CHART

SOFTWARE NOTES

More hats tossed in database review ring

Three more database vendors — **The Santa Cruz Operation** in Santa Cruz, Calif., **XDB Systems, Inc.** in College Park, Md., and **Intersystems** in Cambridge, Mass. — have signed up to participate in the **1988 Unix Expo Database Performance Review**, to be held from Oct. 31 to Nov. 2.

Other participants include Unify Corp., Concept Omega, Micro Database Systems, The Small Computer Co. and Worldwide Data. In addition, Neal Nelson & Associates, which is chairing the performance review, has invited customers, developers and consultants to participate, since many major vendors have responded that they are unable to find the time and resources.

The Chicago branch of Analysts International Corp., a consulting firm based in Minneapolis, has offered to provide programming resources for a

test of Oracle Corp.'s Oracle database — if the firm agrees.

Verdix Corp. in Chantilly, Va., announced that its **Verdix Ada Development System**, or VADS, has been chosen by General Electric Co. for a U.S. Navy submarine control system. VADS was designed to facilitate application development in the Ada language for use in mission-critical and embedded computer applications.

Each development system was designed for use with a specific computer and must be validated annually. Nearly 40 VADS have been validated to date. The current VADS consists of an Ada compiler and more than 20 software tools. The GE contract is expected to bring Verdix approximately $1 million in revenue for the year.

The Small Computer Co. in

Hawthorne, N.Y., has been selected as one of **Unisys Corp.'s** 11 master value-added resellers (VAR) in the U.S. The master VAR agreement allows Small Computer to market Unisys' complete line of PCs and minicomputers with its File Pro database management product line for Microsoft Corp.'s MS-DOS and Xenix systems.

Tops, a division of Sun Microsystems, has acquired from Symantec Corp. its In Box electronic mail package for Apple Computer, Inc. Macintosh and personal computer local-area networks. Under the agreement, Tops has gained all marketing and product development rights to In Box, and the product's developers and support staff will join the Tops division. Tops develops and markets networking products for Macintoshes, IBM Personal Comput-

ers and Unix-based machines, including Sun workstations. According to a Tops official, the company intends to create an E-mail standard for the entry-level LAN market.

Dynamics Research Corp. in Andover, Mass., announced the availability of the Adamat software quality analysis tool on Sun workstations and the Rational R1000 Development System. Adamat is also available on the Digital Equipment Corp. VAX series under VMS.

Radley Business Computers, a West Bloomfield, Mich.-based authorized MCBA installer, announced that its Caras electronic data interchange (EDI) package is now integrated with MCBA's accounting, distribution and manufacturing applications for the DEC VAX. The EDI package enables electronic transmission of business documents, such as purchase orders and invoices, between vendors and suppliers.

Inmon

same business purpose. The only difference was the normalization or denormalization of the data.

The first set of transactions was normalized. Eight tables were accessed by the transactions with 30 to 90 rows accessed per transaction, 50,000 rows per table, with a row length of 65 bytes.

The second group consisted of four tables with 20 to 60 rows accessed per transaction. There were 25,000 rows per table with a row length of 115 bytes.

The third group had two tables and 15 to 30 rows accessed per transaction with a row length of 215 bytes.

The progression is toward an increased degree of normalization. As data is normalized, there are fewer tables with less dynamic interrelationship between tables and larger row sizes.

The job stream uniformly did 10% update and 5% insert/delete activity. The rest of the activity was simple access and retrieval of data. Each update changed the length of the row.

Two benchmarks were run

on DB2 under IMS/DC. Transaction Processing Network Simulator (TPNS), an IBM software product that generates transactions, was used for the network driver, running on an IBM 3090 Model 200. Both simulated the same level of user activity — 100 terminals, each serving up a transaction every 10 seconds.

The first benchmark used only transactions from Group 1, the normalized lot of transactions. The second used only transactions from Groups 2 and 3, the denormalized lot.

The results

The normalized run had an average response time of 1.48 sec., queue to queue. The second run, the denormalized one, had an average response time of 0.37 sec.

The average CPU utilization for the first run was 16%, with a maximum usage of 21.4%. The average CPU utilization for the second run was 11.1%, with a maximum of 12.5%.

These numbers indicate that normalization of data, if you care about performance or hardware utilization, is one of the most expensive things you can do. Depending on which set of numbers you look at, normalization costs from 100% to

400% as much as denormalization in terms of performance and hardware usage.

Put another way, if it takes 10 million instructions per second (MIPS) to run a normalized application, it takes 5 MIPS or less to get the same throughput with denormalized data.

Every time someone mentions denormalization, there is a hue and cry that anyone who denormalizes data is setting back the progression of the industry. But there is no reason denormalization must be done stupidly. When it is done intelligently, the benefit is much higher levels of performance.

Coleman says normalization is fine for some applications:
- Very small data bases in which most data can be put in main memory or a few physical blocks of data on disk.
- Databases that do not require performance or in which there is no concern as to the amount of hardware needed to support the database.
- As a basis for the first cut at database design, before data must be physically defined to the DBMS.

Inmon is a senior principal at American Management Systems in Lakewood, Colo., and an author on the subject of database design.

HARD BITS
Buckeyes choose Honeywell

The Ohio State Teachers Retirement System recently bought a **Honeywell Bull, Inc.** system worth $2.7 million that will serve as a disaster recovery unit. The system includes a DPS/8000/82 mainframe, a 3380 storage subsystem, two front-end processors, a DPS 6 Plus minicomputer and a local-area network. The system will serve as a backup for the association's primary computer facility, which is also made up of Honeywell equipment.

Systems Industries, Inc. said it is shipping its disk subsystems for the Digital Equipment Corp. platform. The SI93 will be offered with a 10% price cut as well. A typical subsystem with eight SI93 disk drives now sells for $134,700, down from $152,200. The company said maintenance fees have also been cut by as much as 50%. A five-year maintenance contract for the eight-disk-drive subsystem is now priced at $21,034.

The North American Aircraft division of Rockwell International has installed a superminicomputer from **Convex Computer**

Corp. The C210 single-processor system will be used for computational fluid dynamics.

Atlantic Computer Systems, Inc., a subsidiary of Atlantic Computers PLC, recently acquired another leasing firm, Datalease Corp. in Westport, Conn. Atlantic leases IBM and DEC systems. Datalease has operated in those markets as well but also leases Wang Laboratories, Inc. equipment.

DaiNippon Screen Manufacturing Co. Ltd in Kyoto, Japan, has agreed to resell ink-jet printers made by **Iris Graphics, Inc.** The printers will be rolled into a system DaiNippon will market that includes an Intel Corp. 80286-based processor.

Apollo Computer, Inc. announced it has begun shipping its Series 1000 Personal Supercomputer, which is based on a new Apollo architecture. The architecture, called Parallel Reduced Instruction Set Multiprocessing, is said to provide supercomputer-like functionality in an office system. The systems start at $70,000.

DB2 2.2

Glover Ferguson, director of development for the Foundation DB2-based computer-aided software engineering tool at Arthur Andersen & Co. in Chicago, suggested that IBM's early announcement could have been because of a different reason.

"They may want to freeze the market," Ferguson said, pointing to competition IBM faces from software vendors offering similar distributed relational capabilities on both IBM and non-IBM hardware. He noted that Oracle Corp. and Relational Technology, Inc. both offer multisite read and single-site update —

two features announced in Release 2 Version 2 — for users of Digital Equipment Corp. systems.

Ferguson said that if distributed relational features are available now under DB2, it would be in IBM's interest to make them available as soon as possible in order to encourage IMS users who have implemented distributed functions under that system to convert to DB2.

Dale Kutnick, an independent consultant in Redding, Conn., said the company has actually solved most of the key technical requirements of a distributed relational database and, in fact, implemented them in R-Star, an in-house IBM distributed relational prototype.

R-Star is an MVS-to-MVS database, many features of which are likely being in-

cluded in the new release of DB2. However, it is IBM's goal to create a distributed relational system that includes OS-based Personal System/2s and Application System/400s and its own unique relational database. A commitment to include these systems makes implementation more difficult and time-consuming, several analysts said.

Kutnick said R-Star includes a two-phase commit, necessary for updating multiple sites. However, implementing a two-phase commit in a commercially available product across a large corporation's network using disparate systems is difficult, Ferguson pointed out. And there are other potential stumbling blocks.

"They have not even tackled the theoretical nightmares, such as a join between

two different tables on two different nodes," Ferguson said.

Nonetheless, IBM's customer letters, sent with the announcement, mentioned both OS/2 Extended and OS/400 as equal players in the distributed relational database of the future. "IBM intends to implement distributed unit-of-work access from any SAA relational environment to any SAA relational environment," the customer letter said.

A source familiar with DB2 development said the new version of QMF, announced with the new DB2 2.2, also indicates seriousness about implementing SAA. The QMF version, which is menu-driven and usable by non-data processing professionals, parallels the query product on IBM's OS/2 Extended Edition.

Hamilton

these two announcements is a typical example of DG's problem. The company consistently fails to manage its announcements — good or bad — in a way that helps its image. And the more it hurts its own image, the harder it is for DG get the industry back on its side.

The product announcement had been in the works for weeks; invitations went out in early September. Yet the company sprung the bad news on the industry just days beforehand, managing to rain on its own parade.

Work on that delivery

Bad news is bad news, and I wouldn't suggest that DG try to fluff off layoffs as strictly a positive thing. But the way the company delivered the news could have been improved upon. DG could have worked more closely with customers and industry analysts who help shape opinion to help them understand why the consolidations were taking place. Instead, the firm just dropped the news on the industry, catching people by surprise. What this got DG was more skepticism and concern that the company can't resolve its problems.

According to one industry analyst, DG executives provided an advance announcement of the big product introduction during the week before the consolidation announcement. The presentation was upbeat, and no mention was made of future cutbacks. The analysts, as one told me, came away feeling pretty good about DG.

Then they got the surprise news that DG was axing 800 jobs and closing two plants. This, to say the least, didn't go over well.

So the product rollout had a dark cloud hanging over it, which took away from the what was actually being announced. Afterwards, observers wrapped their praise of the product in heavy skepticism.

"Buying decisions are no longer just price/performance decisions," said Steven Widen, an analyst at TFS, Inc. in Westford, Mass. "Long-term viability of the company is very important.

"Image is a very difficult thing," he added. "Once a bad one is attached to a company, it's very difficult to get rid of it. DG will continue to struggle with that."

Hamilton is Computerworld's senior editor, systems.

IBM

"IBM — The Next Five Years," a pay-per-view satellite broadcast by the Computer Channel, Inc. The Floral Park, N.Y., start-up firm is taping a series of programs on computer networking, database management and other issues to sell to corporations as a substitute for sending MIS staff members to technical conferences.

Braude said SAA, while not yet a full-fledged software architecture, is more than a "marketing" architecture. "It is a blueprint for IBM. It is what it would do if it only could," Braude noted. While IBM customers would be naive to believe IBM can accomplish all the goals of SAA quickly, he said, it is likely to push to completion the parts of SAA that rest on a firm business case.

Those include implementing SQL and relational databases across its range of hardware platforms and providing common communication protocols and end-user interfaces for users at each level of corporate computing, he said.

IBM has couched its description of SAA as a pursuit of software portability across its varied operating system environments. But what it is likely to deliver, Braude said, is a "single-system image" to end users working on intelligent workstations.

White collars and SAA
Most white-collar workers will be workstation users within six years, and under SAA, they will not need to know where data is located or how to access it. They will not need to be trained in the individual idiosyncracies and commands of the application they are using, because software written for SAA will make use of a common user interface and background communications.

IBM prefers to talk about software portability rather than single-image systems because "the marketing folks chose a simpler message rather than a more complex message," Braude said. But the Gartner Group believes IBM will succeed in migrating its customer base to SAA. By the late '90s, IBM will be free to add parallel processors or neural networks to a corporate computer environment, and end users will not be aware of any change in the underlying processors, he said.

Such a move would also free IBM to move to an operating system that could not be duplicated by competitors, according to Braude.

Other predictions included in the broadcast concerned IBM's mainframe relational database management system, DB2, and its still unannounced repository, or system dictionary.

The Gartner Group believes IBM will have succeeded in placing DB2 in all its major accounts by the year 2000 and is likely to have it in nearly every customer site by 2005. It estimates the number of licenses sold to date at 3,100, compared with 4,800 licenses sold for IMS, IBM's older, hierarchical database system.

By 1990, the Gartner Group expects that ratio to be reversed, with DB2 enjoying a larger installed base than IMS by a margin of 5,400 to 4,960. The gap will continue to grow after that as DB2 takes over more and more of IMS' work, Braude said.

IBM views keeping a leading edge on DB2 as essential to success against other software vendors, including Computer Associates International, Inc. and Oracle Corp. IBM's rapid moves with DB2 are making it more and more difficult for independent software vendors to justify the research and development expense to compete in the DBMS arena, he said.

While IBM's often referred to but unannounced repository may set a world record for conjecture, it is expected to materialize next year as a single point of system information. It will make available key information in a mixed operating system environment and serve as a foundation for software development, Braude predicted.

With a repository and SQL-based DBMS systems dominating the scene, IBM will furnish a playing field on which customers and third-party vendors will find it easier to write applications.

The level playing field will spur demand for computing resources, generating IBM revenue, and megaplayers will emerge as software suppliers. CA, which recently became a $1 billion company with the acquisition of Applied Data Research, Inc., is the prototype for what is likely to be about 11 companies supplying 80% of the software by the mid-1990s, Braude said.

Oracle, Microsoft Corp., Digital Equipment Corp. and IBM itself are likely to be among the group, he noted.

With the price of admission to this select group rapidly going higher and higher, the Europeans and Japanese are likely to try to form business combinations that allow them to stay in the race with the American software giants, Braude said.

Hitachi adds optical unit

SAN BRUNO, Calif. — Hitachi America Ltd. has introduced a high-performance 5¼-in. write-once optical-disk library unit featuring high-speed access and a small computer systems interface (SCSI).

The OL101 has a maximum storage capacity of 28.8G bytes configured with 48 optical disk cartridges and was designed for connection to a host via an SCSI bus, the firm said.

The unit also features a front-loading cartridge mechanism, equipment and error status reporting on a 2-char. LED panel and an internal maintenance panel for off-line diagnostics.

The OL101 incorporates as many as four optical disk drives, an optical formatter/controller and an automatic cartridge-loading mechanism. It also features a 690K bit/sec. data transfer rate, an automatic detection/correction function and a battery-powered memory backup.

The OL101 is expected to be available in the second quarter with pricing of a 48-cartridge configuration set at $26,000, the firm said.

Accounting

Inc. and Hewlett-Packard Co. environments, building on its success in the database market.

On the mainframe side, Walker Interactive in July announced IBM DB2 support for its financial applications. And the mainstays of the IBM world, McCormack & Dodge Corp. and Management Science America, Inc., recently enhanced their aging product lines and made moves into the mid-range market.

Financial applications are being integrated with word processing, electronic mail, spreadsheets, decision support and graphics to improve presentation and communication of financial information. Features becoming standard with financial applications include the ability to customize screens and tailor menus, integration with productivity tools and user-defined keystrokes.

The net result of these improvements is to give users more control over their operations. Financial systems need to be more flexible than ever in order to adapt to changes in today's business environment, in which change is the only constant, several users said.

F INANCIAL SYSTEMS need to be more flexible than ever in order to adapt to changes in today's business environment, in which change is the only constant.

Ross is the latest vendor to inaugurate new functionality with its Renaissance series. The product line succeeds the firm's MAP line and was designed to allow integration of applications in a single operating environment. The software features the ability to integrate the Ross financials with other VAX applications, such as spreadsheets, word processing, decision support and Vaxmail, Ross said.

The Renaissance series consists of general ledger, accounts payable and purchase order — all available now — and accounts receivable and fixed assets — set for availability in first-quarter 1989. Upgrades are free under the maintenance contract; otherwise, prices start at $23,000, depending on CPU.

"The financial accounting software market is a market waiting for something new to break it loose, and that is a characteristic of a mature market," said Robert Cameron, a senior industry analyst at Dataquest. What is needed to break it loose? "A good distributed application."

Oracle Financials may be just what the doctor ordered to liven up the ailing market, according to Oracle. Built on the Oracle relational database management system, the financial applications were designed to run transparently across many computer systems and will soon be integrated with E-mail, the vendor said.

Bending with the wind
Flexibility is certainly one of the most important qualities of financial systems today, according to users. In a situation typical with many mergers and acquisitions today, when R. J. Reynolds merged with Nabisco, a whole new accounting structure was required, according to Charlotte Myrick, manager of financial reporting and development at R. J. Reynolds Tobacco International.

Flexibility to change was clearly the most important consideration in choosing accounting software, Myrick said. The tobacco division decided on M&D's General Ledger:Millenium Release 3.0 because of its customization and consolidation capabilities.

Walker Interactive's Brownlee said IBM's Systems Application Architecture is the way to go for large shops. The company announced availability of its Strategic Software financial applications under DB2 in MVS environments in July. The products also work with IMS, Software AG's Adabase, Cullinet Software, Inc.'s IDMS and Applied Data Resources' Datacomm and provide customers with a migration path to DB2.

Walker said there is a definite shift to doing processing on the workstation in conjunction with a host mainframe. "There will be a fantastic shift in what people think is a workstation strategy" as IBM's workstation strategy evolves, he said. And Walker technology will take advantage of that, he added.

M&D also is looking to workstations to complement its mainframe line; last year the firm introduced the Satellite versions of General Ledger and Accounts Receivable as cooperative processing software.

New is not necessarily better, however. To some customers, like Mike Wolfe, a plant controller at James Hardie Gypsum, Inc. in Las Vegas, reliability is what counts. Wolfe chose MCBA software last year for its accounting operations. MCBA was a pioneer in the VAX packaged accounting software market back in 1975 and has more than 25,000 installations.

When an unexpected change in operations shut Wolfe's firm off from access to headquarters operations, the company had to get an accounting system up and running in six weeks. After evaluating many options, the firm chose MCBA because it was proven and easy to install, Wolfe said. In Wolfe's opinion, the functionality of most packages on the market is comparable; what is important is that updates and enhancements are timely and keep up with changes in tax rules.

Disaster recovery arena catches fire

BY JAMES DALY
CW STAFF

There's an old saying that there are two times when you prepare for a disaster: the first time you're taught how and the first time you lose something important. Apparently, many data centers are not about to make the latter mistake.

A recent study by Focus Research Systems, Inc. found that the use of disaster recovery and backup systems has grown dramatically during the past two years and that the average data processing manager's preoccupation with protection is not liable to abate.

More than 91% of the IBM and plug-compatible mainframe sites surveyed have prepared for the worst and made contingency plans for calamity with some sort of disaster backup and recovery system. Only two years ago, nearly 40% had no disaster backup and recovery plan at all.

"Many industries have suddenly awakened to the fact that their data is very valuable," said Scott Brown, a researcher at Focus. "We've seen a lot of interest from companies in very information-oriented industries, like insurance, finance, banking and utilities."

Well-publicized upheavals like a 1986 Boston fire that damaged the Putnam mutual fund companies, electrical mishaps in Manhattan last year that sidelined the computers of Chase Manhattan Corp. and Manufacturers Hanover Corp. and a fire in May at a telephone switching station in suburban Chicago that knocked out more than 150,000 computer-to-computer connections [CW, May 16] have tended to serve notice of the importance of disaster recovery. But the report did not name specific causes for the turnabout.

Buy safety

Under a commercially available disaster recovery plan, companies essentially buy an insurance policy in the event that a fire, flood or other disaster cripples an essential system. The customers buy a guaranteed space on a backup computer on which they can run their programs until the original machines are fixed or replaced.

Disaster recovery firms have, in turn, greatly benefited from the new interest in contingency planning. Sungard Data Systems, Inc. nearly doubled its revenue during the past five years to $91.1 million in 1987, while Comdisco, Inc., which specializes in computer leasing, said its disaster recovery revenue was about $60 million in the fiscal year ending Sept. 30 — a 50% increase from a year earlier.

CASE

"There's a lot of confusion between CASE tools and CASE methods," he said. "All too often, people want — and in many cases expect — to buy a tool, turn it on, and have it magically produce dramatic results. When it doesn't, they feel betrayed and say that CASE doesn't work."

For example, Smith said, a front-end CASE design tool might present the user with three alternate ways to represent a step in the software design process. However, what it will not do — cannot do — is tell the user which of the three to produce first. For this, Smith said, you need a methodology — a fact many users do not grasp until inconveniently late.

What is more, Smith said, in some cases, potential users are being inadvertently misled about the complementary roles of tools and methods. "I'm not sure," he said, "that all the vendors appreciate the distinction."

Users are also facing questions about who the customer is and who the software is really being designed to serve, said Larry Bergen, information systems manager at the Seattle-based Northwest Division of Wilbur-Ellis Co. As a sales distribution business serving the agricultural industry from 55 separate locations, Wilbur-Ellis' customers range from one-man farms to large conglomerate organizations, Bergen said. The information systems department is currently trying to design an order-entry system to be used in the company's sales department. "Who do we aim it at?" Bergen asked.

Wrestling with this question, he said, leads to another issue. Both, Bergen hopes, will be beneficially addressed by the CASE Users Group.

To create software that actually serves a company's needs, "software designers have to know and understand what those needs are, how the business works, what kinds of goals it's trying to meet," Bergen said.

More than just code

Software, he said, "isn't just program code — it's the implementation of the way the business people are thinking." Conversely, a software system should be a tool for the way people do business. CASE ideally should serve both of these ends, he said. To reach that ideal, however, there has to be a level of communication and interaction between the business people and the systems people that is all too often lacking.

Therefore, Bergen said, when it comes to CASE education and interchange of ideas, "I need a forum where I could very freely invite business people, without putting them to a great deal of expense and inconvenience, and have them consistently return."

Vendor-specific groups that meet once or twice a year on a national level, he said, whatever their benefits, do not provide such a forum; the Case Research-sponsored group might.

NEW PRODUCTS — SYSTEMS

Processors

Adra Systems, Inc. has enhanced its Adra 3000 design drafting system.

According to the vendor, the **3000 Plus** system offers improvements for windowing and computer-graphics augmented design and manufacturing database translation functions in addition to a larger display format and increased hard-disk capacity.

Pricing for the 3000 Plus begins at $16,995, and current Adra 3000 users can purchase a performance upgrade kit for $895.

Adra, 59 Technology Drive, Lowell, Mass. 01851. 617-937-3700.

IBC/Integrated Business Computers has introduced a 32-bit supermicrocomputer based on the Intel Corp. 80386 processor.

Designated the **386:120/40**, the machine is available in floor-mount and desktop models and operates at speeds of 20 or 25 MHz, the vendor said. The unit supports from eight to 120 ports and up to 24M bytes of main memory.

A fully configured 120-port version, including The Santa Cruz Operation, Inc.'s SCO Xenix 386 operating system, is priced at about $85,000.

IBC, 21621 Nordhoff St., Chatsworth, Calif. 91311. 818-882-9007.

Data storage

A cartridge tape subsystem designed for IBM mainframes and plug compatibles is now available from **First Alliance Software and Technologies, Inc.**

Dubbed the **Fast A480**, the subsystem is reported to be fully format- and media-compatible with the ANSI-standard IBM 3480 cartridge tape device.

Data transfer rates vary from 1.5M to 3M byte/sec., depending on the channel selected, and the actual transfer rate from the tape drive to the buffer is 3M byte/sec.

Fast A480 is available in three configurations priced from $54,870 to $136,610.

First Alliance, First Alliance Plaza, 11770 Bernardo Plaza Court, San Diego, Calif. 92128. 619-487-8030.

I/O devices

Digital Design, Inc. has introduced the **Laser Check Printer Model 636**, which is configured to produce checks on any business form or blank paper, the company said.

The standard ASCII printer is said to incorporate both Centronics Data Computer Corp. parallel and RS-232 serial ports as well as a proprietary software tool for document design.

Laser Check Printer Model 636 costs $7,388.

Digital Design, Suite 101, 2955 Hartley Road, Jacksonville, Fla. 32217. 904-268-4307.

Digital Design's *printer*

Electrohome Ltd. has added two monochrome monitors to its line of professional video display products.

The **Vari-Scan EVM 900** 9-in. model and **EVM 1200** 12-in. model are targeted at the medical and financial marketplaces, the company said. The units feature ultrasound capabilities and can reportedly display 16 discernable levels of black, white and grey.

Chassis design includes antinoise circuitry to minimize cross-talk between monitors that are situated close to one another. Bandwidth is 40 MHz with a resolution of 1,056 pixels at 36 KHz, and standard interfaces include composite video or synchronous output.

The EVM 900 costs $715, and the EVM 1200 is available for $797.

Electrohome, 809 Wellington St. N., Kitchener, Ont., Canada N2G 4J6. 519-744-7111.

Exac Corp., a manufacturer of mass flow-meters for the process instrumentation and control markets, has announced an accessory prouduct — the **Model PX-90 Ticket Printer**.

The product is a stand-alone printout device said to print single- and multipart forms in virtually any size. The unit interfaces via the Exac RS422 communications port for data transfer and is especially suited to custody transfer, point-of-sale and recordable batch control applications. Engineering units can be configured for pounds and gallons or kilograms and liters, the vendor said.

The Model PX-90 Ticket Printer costs $1,400.

Exac, 6410 Via Del Oro, San Jose, Calif. 95119. 408-365-3500.

Mitek Systems, Inc. has announced its Tempest Postscript laser printer, the **Model 130T**.

The product was reportedly designed to provide full Adobe Systems, Inc. Postscript printing capabilities to government users in sensitive information processing environments. Features include 35 resident fonts and a 200-sheet input tray with a manual feed slot for envelopes and odd paper sizes.

Total memory is 2M bytes, and the printer supports RS-232, RS-422, Apple Computer, Inc. Appletalk and Centronics Data Computer Corp. parallel interfaces.

The Model 130T costs $8,995.

Mitek, 6225 Nancy Ridge Drive, San Diego, Calif. 92121. 800-367-5660.

Dataproducts Corp. has introduced enhanced versions of its LM **300/315** and **LM 600/615** line matrix printers. The units now feature Printronix, Inc. P-Series emulation, improved print bar design and extended verifiability of ribbons, according to the vendor.

The printers also support Hewlett-Packard Co.'s Printer Control Language. The LM series prints text and line characters as well as graphics and bar code and has a reported mean-time-between-failures rate of up to 8,600 hours. The tabletop LM 300 model prints up to 420 line/min; the LM 600 prints up to 840 line/min and is configured in a full cabinet. Both the LM 315 and the LM 615 include quiet full cabinets with a reported rating of 55 dba, the vendor said.

The LM series is priced starting at $5,795.

Dataproducts, P.O. Box 746, Woodland Hills, Calif. 91365. 818-887-8000.

Hewlett-Packard Co. has added two features to the **Ruggedwriter 480** printer.

The 24-wire, 480 char./sec. dot matrix printer can now handle six-part forms and has a recommended maximum use of 5,000 pages per month, the vendor said.

Ruggedwriter was introduced in September 1987 and formerly produced four-part forms and had a recommended use of 3,000 pages per month. The printer incorporates RS-232C serial, Centronics Data Computer Corp. parallel and HP-IB I/O interfaces.

Ruggedwriter 480 costs $1,695.

HP, Customer Information Center, Inquiry Fulfillment Department, 19310 Pruneridge Ave., Cupertino, Calif. 415-857-1501.

A high-volume page printer has been introduced by **General Business Technology, Inc.**

The **GBT 6615XP** reportedly attaches to all models of the IBM Application System/400 as well as IBM System/36 and 38 machines.

The 15 page/min printer has 300 by 300 dot/in. resolution, according to the vendor.

The GBT 6615 costs $7,995.

GBT, 1891 McGaw Ave., Irvine, Calif. 92714. 714-261-1891.

T & B Computing, Inc. has revised **Gigasav**, its videocassette recorder-based subsystem.

The product can now be used with Prime Computer, Inc. machines.

The subsystem can back up 1.6G to 2.4G bytes on a single standard VHS videocassette in six hours or less, the vendor said. Gigasav consists of a VCR unit, cabling and software; it attaches to the standard Prime streaming-tape controller.

The software is said to be command-identical to Prime's MAGSAV/RST, without modifications to Primos, the Prime operating system, or Prime utilities.

Gigasav carries a price tag of approximately $10,000.

T & B Computing, 1100 Eisenhower Blvd., Ann Arbor, Mich. 48108. 313-973-1900.

Power supplies

Nova Electric, Inc. has announced the **On-Line** 3- and 10-kVA uninterruptible power supplies (UPS) for computer systems and process control systems applications.

The units are mounted on casters and measure 22 by 22 by 37 in. high.

Pricing for the products ranges from $6,495 to $8,495, with approximately eight to 10 weeks required for delivery.

Nova, 263 Hillside Ave., Nutley, N.J. 07110. 201-661-3434.

Nova's *UPS series*

Decision Data Computer Corp. has unveiled an uninterruptible power supply (UPS) that provides up to 20 minutes of 200-watt standby backup power for small computer systems, the company said.

Designated the **DDCC 5920**, the unit features output protection provided by a 20A fuse in the inverter primary circuit and input protection provided by a 3A line fuse. Normal mode I/O is 102 to 127 VAC; maximum transfer time is reportedly half a cycle.

The DDCC 5920 costs $295.

The company also introduced the **5953**, a compact, on-line uninterruptible power system that was designed for use in an IBM System/38 MIS environment.

Ten 5953 modules in 10-, 18.75- and 25-kVA sizes are available and provide 120/208 or 277/480 input and output voltage. Other features include quiet operation and the ability to handle start-up surges in excess of 300% of UPS capacity. An internal maintenance bypass switch is also provided, and a remote status panel may be purchased to display critical information up to 1,000 feet from the UPS.

Pricing starts at $21,950 for 10-kVA modules; 10-kVA sidecar batteries cost $2,850.

Decision Data, 400 Horsham Road, Horsham, Pa. 19044. 215-956-5736.

NEW PRODUCTS — SOFTWARE

System software

A personal computer-based expert system for tuning IBM MVS systems has been introduced by **Domanski Sciences.**

Performance Advisor runs on IBM Personal Computers, PC XTs, ATs, Personal System/2s and compatible machines; it is reported to be an ideal training tool for novice system programmers. Help and Why screens are included.

Performance Advisor is available for $495.

Domanski, 16 Colonial Court, Howell, N.J. 07731. 201-367-0257.

On-line Software International, Inc. has announced an IBM CICS resource management system.

According to the vendor, **Dads/Plus** allows data center operators to carry out traditional CICS facility management tasks while providing applications users with continuous system availability. The software runs with CICS 1.6.1 or later versions under IBM's MVS and MVS/XA

operating systems.

Dads/Plus is currently being offered at an introductory price of $11,000.

On-Line Software, Fort Lee Executive Park, 2 Executive Drive, Fort Lee, N.J. 07024. 201-592-0009.

Development tools

A new version of the **Domain/Ada Development System** has been announced by **Apollo Computer, Inc.**

Reported enhancements to the company's 2.0 release include an improved debugger that utilizes windows; a mouse and graphics; and integration capabilities with the Domain Performance Analysis Kit software.

Ada is a machine-independent, high-level programming language that is mandated for much of the new U.S. Department of Defense software. The Domain/Ada system, which is based on the Verdix Corp. Ada Development System, is fully supported by Apollo.

Domain/Ada 2.0 costs $6,000 per copy. Quantity discounts begin with two copies, with pricing

for two at $3,900 per copy.

Apollo, 330 Billerica Road, Chelmsford, Mass. 01824. 508-256-6600.

A full-function application generator for supporting Cobol application development has been announced by **Sage Software, Inc.**

Based on IBM Personal System/2 technology and the Micro Focus Cobol/2 Workbench, **APS/PC** reportedly generates applications for either the personal computer or MVS mainframe environment.

According to the vendor, development is supported from physical design and prototyping through generation and unit testing. This can be done totally independent of the mainframe. The recommended environment for the product includes an IBM PS/2 Model 70 or 80, 3M bytes of extended memory, 640K bytes of random-access memory and a 5M-byte hard disk.

APS/PC is priced from $5,000 to $7,500, depending on configuration.

Sage Software, 3200 Monroe St., Rockville, Md. 20852. 800-638-8703.

Software Maintenance and Development Systems, Inc. has announced that its **Aide-De-**

Camp (ADC) software management system is now available in a version to run under the Santa Cruz Operation's SCO Xenix.

The management system has been available on software development platforms at the minicomputer and workstation level, including Sun Microsystems, Inc. machines, Digital Equipment Corp. VAXs and other vendor offerings. The SCO Xenix-configured version of ADC is targeted to run in a 32-bit architecture environment.

The ADC system can be used to develop software in any language on a variety of Unix and proprietary operating systems, the vendor said.

The ADC system for SCO Xenix costs $2,500. Pricing for the software on workstation and minicomputer platforms ranges from $5,800 to $15,200, depending on the model and configurations.

Software Maintenance and Development Systems, P.O. Box 555, Concord, Mass. 01742. 508-369-7398.

Generics Software Ltd., a software company based in Ireland, is now marketing its Ada systems development tool set in the U.S.

Called **Animaid**, the product was designed for engineers in-

volved in Ada system production; it reportedly offers tool support during the coding, prototyping, testing and user interface generation stages of development.

According to the vendor, Animaid is not restricted by method, compiler or environment. The product offers support for most workstation platforms, including Digital Equipment Corp., Apollo Computer, Inc. and Sun Microsystems, Inc.

Animaid is priced from $13,430 for use in a workstation environment. The documentation set costs $85.

Generics, 7 Leopardstown Office Park, Foxrock, Dublin 18, Ireland. 353-1-954012.

AGS Management Systems, Inc. has released **Version 1.4** of **Multi/Cam**, the company's computer-aided software engineering management software.

The product is reportedly used in a microcomputer-mainframe system environment to enable system analysis and design, program development and project management functions. According to the vendor, training can be accomplished from one fully automated workstation.

The latest release includes

updated documentation and full support for the IBM character set. The product's purchase package life cycle facility has been expanded to include a recommendation report checklist.

The Multi/Cam system with five workstations, including the complete methodology library, costs $97,000.

AGS, 880 First Ave., King of Prussia, Pa. 19406. 215-265-1550.

Transform Logic Corp. has announced three new versions of **Transform**, the company's computer-aided software engineering product designed to automate application generation and maintenance for IBM mainframes.

The products are targeted toward business analysts, systems designers and applications programmers, and all three versions are said to be fully compatible with each other.

Transform/Developer is for entry-level full-function transaction generation. **Transform/Specialist** was designed for advanced application generation, and **Transform/Expert** is aimed at advanced application integration and environmental management. Each product is built around a proprietary data dictionary, the vendor said.

Developer costs from $40,000 to $100,000; Specialist is priced from $125,000 to $240,000; and Expert costs between $184,500 and $355,000.

Transform, 8502 E. Via De Ventura, Scottsdale, Ariz. 85258. 602-948-2600.

Logicware, Inc. has announced an expert system shell that allows users to create expert systems on IBM mainframes, Digital Equipment Corp. VAX machines and in a Motorola, Inc. 68000 environment.

Called **Twaice**, the product reportedly features English-like rules, two inference engines, extensive explanation facilities and a knowledge analyzer. The package includes the full Mprolog system and is offered with a complete support, education and maintenance program, the vendor said.

Pricing varies, depending on system and type of license required.

Logicware, Suite 2100, 237 Park Ave. New York, N.Y. 10017. 212-551-3536.

Applications packages

NMC Technologies, Inc. has released **Version 2.0** of its **Accounts Receivable and Credit Collection** (ARCC) software package for the IBM System/38 environment.

The customer's bank account number, check number and check amount can be transmitted via on-line communications and written to the System/38. The ARCC program will split the transmission into cash batches and automatically apply checks against customer invoices. The product is written in RPG III. A version for the IBM Application System/400 is slated for release this fall.

ARCC 2.0 costs $35,000.

NMC, Suite 103, Bedford Sq., 1314 Bedford Ave., Baltimore, Md. 21208. 301-653-9400.

Intelligent Software Products, Inc. has announced a security software system for the Xenix and Unix operating system environments.

Called **Sentinel**, the menu-driven package reportedly secures all communications lines allowed by the operating system. It also limits users to specified terminals and denies access to unauthorized users. Features include multiple passwords per user, callback telephone numbers for modem users, controlled access times and allowable terminals and various log files.

Sentinel is priced from $250 to $350, depending on the operating system and the number of communications lines.

Intelligent Software, 19 Virginia Ave., Rockville Center, N.Y. 11570. 516-766-2867.

BBN Software Products Corp. has announced **Version 8.3** of **Dataprobe**, a time-series analysis software for engineers and analysts using Digital Equipment Corp. VAX hardware under the VMS operating system.

The latest release introduces the Flexible File Server, which was designed to give analysts direct access to data files not in the Dataprobe format, the company said. The software also eliminates the need to write custom code for time tag, record header ID and data reformatting.

Primary applications include data analysis from flight testing, telemetry and recording systems and wind tunnel testing in aerospace, automotive and manufacturing applications.

Dataprobe 8.3 costs $30,000 to $75,000, depending on CPU size.

BBN Software Products, 10 Fawcett St., Cambridge, Mass. 02238. 508-873-5000.

A record management system for machines running under the Xenix operating system has been announced by **Specialized Systems Consultants, Inc.**

Called **Zebu**, the product consists of a screen- and file-definition program that allows the user to configure and design the entry screen. The software allows two-level screen definition, function access and on-line data entry by the Unix or Xenix user, the vendor said.

Editing and arithmetic functions are also included within the screen handler. The product can be used for order processing, patient scheduling, subscription systems and other data management functions.

Zebu with the Xenix binary and documentation costs $100.

Specialized Systems Consultants, P.O. Box 55549, Seattle, Wash. 98155. 206-367-8649.

The Metron Group, Inc., an authorized MCBA Corp. installer, has announced a **Trucking Software Package** that integrates with MCBA's accounting and distribution software for Unix-based computers.

Several modules are incorporated to permit a trucking company to handle its entire range of business administration functions. These include dispatch, rating and owner/operator settlement packages. The software also has provisions for vehicle maintenance and repair as well as claims management.

Metron is prepared to license its software directly to end users or to cross-license the system to other MCBA installers. In all cases, Metron will support its own modules within the system.

License fees for the Metron Trucking Package range from $20,000 to $70,000.

Metron, P.O. Box 864840, Plano, Texas 75086. 214-423-2955.

The SAS System, SAS Institute, Inc.'s integrated system of software for data management, analysis and presentation, is now available for the Hewlett-Packard Co. 9000 Series 800 technical computers.

SAS System under HP-UX includes logical, modular components for data-entry retrieval and management; report writing and graphics; statistical and mathematical analysis; and applications development.

The software supports HP-UX, which adheres to AT&T's Unix System V Interface Definition 2, and will be distributed on nine-track tape and data cartridge used on HP's 9144 tape drive.

The first-year fee for base SAS Software ranges from $500 to $7,500.

SAS, Box 8000, SAS Circle, Cary, N.C. 27512. 919-467-8000.

Lachman Associates, Inc. has released **Version 2.0** of its **LAI Security Audit** software package.

The software now offers a new terminal idle check and enhanced reporting and configuration mechanisms, the vendor said.

Additional checks for common Unix operating system security bugs are also included, and a password file check verifies login and password integrity.

Licensing fees for LAI Security Audit 2.0 start at $2,000.

Lachman, 1901 N. Naper Blvd., Naperville, Ill. 60540. 312-505-9100.

Utilities

An integrated journal management and recovery program that was designed to reduce auxiliary disk storage requirements and recreate lost or damaged files has been introduced by **Online Software International, Inc.**

Filesave/RCS will reportedly assist systems programmers, data administrators and other operations personnel in developing a recovery system for managing both on-line and batch program journals. The product will also perform forward or backward recovery for partially corrupted files, the vendor said.

Filesave/RCS runs in the OS environment under IBM's MVS and MVS/XA and costs $12,500 per CPU.

On-Line Software, Two Executive Drive, Fort Lee, N.J. 07024. 800-642-0177.

Chi/Cor Information Management, Inc. has released **Data Set Analysis System 5.0** (DSAS) and **Resource Analysis System** (RAS) — software designed for the IBM mainframe environment. Both products reportedly operate under the OS, VS, VM and MVS/XA operating systems.

DSAS was developed to read and analyze SMF data in order to identify the data sets that must be off-site if an application is to be recovered at an alternate location. The RAS software identifies the minimum computing resources required to execute one or more applications at an alternate site.

Both products are offered under a perpetual license agreement for a one-time fee of $10,000, which includes documentation, tape and a one-year warranty.

Chi/Cor, 10 S. Riverside Plaza, Chicago, Ill. 60606. 312-454-9670.

A data administration and maintenance tool developed for use with IBM's DB2 and SQL/DS has been announced by **Intex Solutions, Inc.**

Called **SQL:Docufact**, the software will reportedly perform several enhancement functions, including identification and enumeration of data base table contents, moving or altering data within DB2 or SQL/DS and transferring data to other systems by translating SQL data into a standard format. The program also provides an audit trail facility.

SQL:Docufact pricing depends on system configuration.

Monthly license fees range from $200 to $500; three-year licenses are priced from $6,800 to $9,800, and permanent licenses are available starting at $7,800.

Intex, 161 Highland Ave., Needham, Mass. 02194. 617-449-6222.

Future Generations, Inc. has introduced **Image Connection**, a software utility designed for use on Digital Equipment Corp. VAX systems running VMS.

The product allows a software application to be shared by an arbitrary number of interactive users, the company said. Each user's screen will reportedly display an exact reproduction of every other user's interactions with the application. Terminal hardware must be application-compatible.

Image Connection costs $995.

Future Generations, 5 Prospect St., Rowley, Mass. 01969. 617-262-8660.

Main Frame Software Products Corp. has announced **Help/Key 2.0**, a program said to provide sophisticated on-line Help facilities to users of IBM's CICS running under the VSE and MVS operating systems.

Recent enhancements to the

program reportedly include a file display facility, user-defined variables, template screens and hard-copy documentation. The software will now support Models 2, 3, 4 and 5 of 3270-type terminals, the vendor said.

License fees for Help/Key range from $9,900 to $12,900.

Main Frame Software, 1 Hollis St., Wellesley, Mass. 02181. 508-239-0288.

Softouch Systems, Inc. has announced two products for the IBM VTAM environment.

VTAM-Windows is a VTAM sessions manager with interactive windowing. The program reportedly allows users to work with IBM's TSO, CICS and IMS all on one screen and eliminates the need to log on and off between applications.

The software supports as many as nine sessions per terminal.

Machine group pricing is from $7,000 to $25,000.

The **VTAM-Express** package was designed to perform terminal data-stream compression at the VTAM level.

According to the vendor, both inbound and outbound compression is provided for every application in the network, and a separate operating region is not required.

The software supports CICS, TSO, IMS and any other VTAM application.

Machine group pricing for VTAM-Express is from $7,000 to $25,000.

Softouch Systems, 8269 S. Walker, Oklahoma City, Okla. 73139. 405-632-4745.

New Generation Software, Inc. has announced **Release 2.0** of **Interactive Query** (IQ), its report-writing and information retrieval tool for the IBM System/38 minicomputer series.

Release 2.0 reportedly includes both the menu-driven and SQL models of IQ support tabling and allows users to create substrings of existing alphanumeric fields.
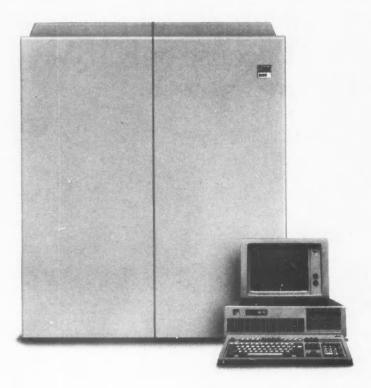
Other features are said to include improved report formatting, command-key access to SQL from the menu-driven mode and a default maintenance facility.

According to the vendor, the software supports easy file joins of as many as 32 files, with sorting, sequencing and selection of records using Boolean logic.
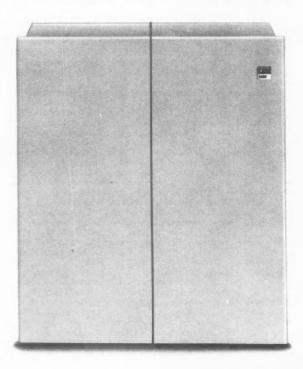
A single-site license for Interactive Query 2.0 costs $8,000.

New Generation Software, Suite 195, 1010 Hurley Way, Sacramento, Calif. 95825. 916-920-2200.

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MICROCOMPUTING

MICRO BITS

Douglas Barney

Waiting and waiting . . .

Not exactly wedded bliss. Some people become attached to programs that are used for hours on end, despite the annoyances of design errors, performance problems and bugs.

Others become far too attached to programs that have been announced but not shipped. These folks start to get more than a bit frustrated as the wait stretches on.

Lotus' 1-2-3 Release 3.0 is a case in point. After the latest six-month delay was announced, users seemed to feel a bit hurt and rejected. That's when it sunk in: It was as if these people were actually engaged to this program and were desperately waiting for the relationship to be consummated.

With some cheapo Radio Shack equipment, it was easy to listen in on a conversation between a Lotus customer and a sales rep, especially since both were imaginary.

"Hey, LDC. You know how devoted I am, don't you? Well, when can I get some, you know, Release 3 action?"

"Oh, now, User Joe. You know I can't let you have it until

Program — training = problem

End users' enthusiasm can lead to duplicated programming, glitches

BY MICHAEL ALEXANDER
CW STAFF

Put a bunch of personal computer users in a room and eventually they will duplicate every application ever written for themselves and their departments. At the same time, they will create every type of headache for the information center manager down the hall.

Thanks to the proliferation of personal computers and a rise in computer literacy, more end users than ever are creating applications using programming languages, databases, spreadsheets and other programs. The applications backlog at many MIS departments, and the desire to get around it, is also speeding end-user applications development.

But the problem is that end users are not computer systems people, pointed out Martha Duke, information center manager at Union Pacific Resources in Fort Worth, Texas. "They are accountants, lawyers or whatever, and computers are not their primary job responsibility, so they don't apply the techniques that are ingrained in the professional programmer," Duke said.

Needless work

Most end users are not adequately trained for applications development work and fail to document, audit and test their applications. Often, the applications are more appropriate for use on mainframes than on per-

sonal computers. When there is little communication between departments, end users may be painstakingly duplicating applications that are readily available elsewhere, said Richard Daniels, a senior systems analyst at Ciba Geigy in Greensboro, N.C.

Compounding these problems is the fact that end users are pressing demands for more support and guidance from information centers to help them implement the systems they develop.

If they do not create documentation and other critical information, when employees leave the company they often leave problems behind, explained Rich Slade, group leader in user services at Argonne National Laboratory in Argonne, Ill. "When the new end user comes to us for help, we don't know anything about the application," he said.

The result is money down the drain, Duke said. "We had to abandon a small local-area network that an individual had helped set up because there was inadequate documentation. The person hired a consultant who did the initial programming, and the end user made changes later. It caused a lot of headaches when the individual left."

Eventually, the local-area network was dismantled and the salvaged hardware was sent to other departments, she said. Even so, the loss amounted to several thousand dollars in lost time and effort.

It is after this sort of cata-

Data View

The allure of Europe
The value of PC shipments to Western Europe is expected to top $22 billion by 1993

Value in billions

1986	'87	'88*	'89*	'90*	'91*	'92*	'93*
$9.19	$11.77	$14.09	$15.32	$17.61	$19.56	$20.99	$22.85

*Projected

SOURCE: INTERNATIONAL DATA CORP.
CW CHART

Rbase aids in murder victim ID

BY STEPHEN JONES
CW STAFF

SEATTLE — When you think of database management programs, you think of corporate accounting and massive files of data. But when Microrim, Inc. thought of its Rbase database system, it thought of crime — a rash of 40 serial killings in Seattle known as the Green River murders.

Microrim Chairman Wayne Erickson developed a microcomputer database application that helps match dental records with the remains of unidentified murder victims. Erickson teamed up with forensic dentists to write the program after Redmond, Wash.-based Microrim was approached by Dr. Donald Reay, the medical examiner for King County in Washington, and the police task force working on the serial killer case.
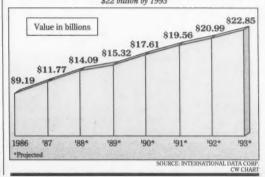
Inside

- Manzi, King tell why 1-2-3 Release 3.0 is late again. Page 45.
- Caper helps special-ed students. Page 45.
- CC:Mail built to work in rain, snow, sleet and dead of night. Page 45.
- Hyundai unveils PC XT compatible. Page 51.

Here's an offer only the most analytical minds in America can appreciate.

Lotus 1-2-3 Release 2.01

Lotus 1-2-3 Release 3

Free Upgrade

Buy 1.   Get 1 free.

After exercising your grey matter with a few hundred "what if's" every day, it's nice to have a no-brainer to deal with. How's this: for every Lotus® 1-2-3® Release 2.01 you buy on or after September 6, 1988, you get a free 1-2-3 Release 3 Upgrade as soon as it's available. (Be sure to save your proof of purchase.)

Easy decision.

After all, 1-2-3 Release 2.01 has recently been rated the top-performing

spreadsheet for an unprecedented fifth straight year by the NSTL.[2] In fact, 1-2-3 is the backbone of business, with over 7 million users who depend on it everyday.

Plus, the upcoming 1-2-3 Release 3[3] will be the most powerful spreadsheet on the market by far, yet it will offer the familiar 1-2-3 interface and be fully compatible with all your present 1-2-3 data, macros and applications.

The new 1-2-3 will offer an exciting

3-dimensional spreadsheet for better organization and consolidation of data. Plus, improved graphics and powerful database enhancements, including the ability to access external databases, like dBase®, from within your spreadsheet.

See your Lotus Authorized Dealer or Lotus sales rep for details.

Lotus 1-2-3

Searching for stars

This will be the last of my regular columns in *Computerworld*. I have devoted much of my attention over the past few years to the accelerating transition to a new era of information systems. I will now, as president of my own company, Canopus Research in Duxbury, Mass., aim to take a more direct and active role in helping users, vendors and the financial community to take advantage of that transition and to avoid its pitfalls.

Personal computers and workstations based on microprocessors, local-area networks, network servers and multiuser, multiple microprocessor-based systems are more than just low-end system elements. They are destined not merely to supplement but to replace traditional mainframe and even minicomputer systems based on proprietary architectures over the coming decade.

Innovative, leading-edge systems are already moving into territory that was once the exclusive domain of traditional systems. Early in the 1980s, the first multiuser microprocessor-based systems from vendors such as Altos Computer Systems began to replace low-end minis for small business applications.

Over the past half-decade, products such as Stratus Computer's more powerful multiuser fault-tolerant systems

Why Release 3.0 is still on hold

Lotus' Manzi, King explain why upgrading 1-2-3 is not as easy as X-Y-Z

IN PERSON

Lotus Development Corp.'s 1-2-3 Release 3.0 is the most important product Lotus has created since the original 1-2-3. The user base has already been prepared for its release with briefings, a free upgrade policy and new full-page advertisements.

The only problem is that Lotus' 1-2-3 Release 3.0 has yet to ship, and now Lotus has told the world that the schedule has slipped again. Instead of having Release 3.0 for Christmas, users will have to wait until the second quarter of next year.

Hours after the announcement, *Computerworld* Senior

Editor Douglas Barney was on the telephone with Lotus President and Chief Executive Officer Jim P. Manzi and W. Frank King, software products group senior vice-president, to find out what the delay means.

This delay is a surprise, given the recent advertising efforts for Release 3.0 and the free upgrade program. How did you determine the new timetable?
King: First of all, the upgrade program is almost standard in the industry. We think it's the right thing so the customers can go ahead and continue to buy Release 2.0 at the rate that they're

Jim P. Manzi

doing. And we have to be doing other things along that line to maintain and increase the value of Release 2.0.

It was apparent to me that we were not going to have the bugs closed down by the end of the quarter. We've made a lot of progress, and we do have a single version of both DOS and OS/2 running single-source (code).

The worksheet size wasn't getting to where we wanted it to get to. We have the ideas and the techniques to get it there, but it isn't there. The last thing we want to do is ship something that doesn't have quality and performance and worksheet size. So it's just a matter of watching the vital signs and concluding that we weren't going to get there by the end of this quarter.

To what extent are other projects contingent upon Release 3.0? For instance, does the graphical 1-2-3/G use the Release 3.0

Expert system cuts diagnosis time

BY MICHAEL ALEXANDER
CW STAFF

When a child in elementary school is having difficulty learning to read, it may not be because he has a bad attitude or disability. It may be because he is

hungry. But some teachers may not recognize the problem for what it is and instead refer the child to a special education program.

"The teachers are overwhelmed, and special education is one of the few places to get

help for getting these kids out of the classroom," explained Jacqueline Haynes, a researcher at Intelligent Automation in Rockville, Md.

Haynes is also the developer of an expert system called Computer-Assisted Planning for Educational Resources, or CAPER, designed to help elementary school teachers and administrators more accurately diagnose pupils and plan instructional programs for them.

"CAPER was developed to help children who are educationally at risk, including those who are having trouble adjusting to mainstream American schools; who are culturally different from many of their classmates; and who are not proficient English speakers," Haynes said.

Schools are devoting considerable resources and personnel to administrative and referral meetings to determine whether a particular child should be

placed in a special education setting. Administrators often discover that if the teacher is unable to work with children with limited English proficiency or socioeconomic problems, he is apt to recommend that the children be placed in special education just to get rid of them.

Helping educators
"Too often, many of these kids are referred for special education and identified as handicapped because teachers and school administrators do not have the knowledge or time to analyze complex individual situations and determine the best instructional plan for each student," Haynes said. "We saw the opportunity to build an expert system that would deliver reliable information and sound recommendations to elementary school personnel."

The expert system, which was developed using the Knowledge Engineering System from Software Architecture and Engi-

Jacqueline Haynes *shows off CAPER*

ERNIE YORK

CC:Mail a big hit with LAN users

BY JULIE PITTA
CW STAFF

PALO ALTO, Calif. — Corporate computer users weary of playing phone tag with co-workers are getting a respite with electronic messaging packages such as CC:Mail, produced by CC:Mail, Inc.

Bruce Fryer, a senior consultant for end-user computing at Baxter Healthcare Corp., is in the final stages of a project to install an electronic messaging system that will accommodate 5,000 users working on 180 local-area networks at the firm. After comparing CC:Mail to other electronic messaging packages, Fryer's group chose it as a standard.

"It requires minimal training," Fryer explained. "It has a very good user interface compared with other E-mail systems, and it is designed to handle very large systems [with] thousands of users."

Another deciding factor in the selection of CC:Mail was the product's ability to run on a number of different types of LANs. Because of its size, Baxter Healthcare uses a variety of LAN products and requires a software package with flexibility.

The National Academy of Sciences in Washington, D.C., is in the business of compiling and disseminating information. The Academy — which boasts a number of branches, including the National Academy of Engineering and the National Academy of Medicine — has been commissioned by the federal government and private industry to compile reports on a variety of topics.

Prior to purchasing an electronic messaging system, the Academy was hampered by its

sole reliance on telephones, as well as a shuttle bus, to drop off information packets to remote sites.

"We deal in information, so

there's a need to pass a lot of it around," said Kit Davis, technology manager of personal computer systems at the Academy.

CC:Mail
Price: $695
• One network post office, 25 local mail boxes on a file server
• IBM PC, XT, AT, PS/2 or compatibles
• MS DOS 3.1
• 320K bytes RAM

Picky, picky, picky

Ever have a try at a password, only to have it not work? Well, if you are a user of Lotus Development Corp.'s 1-2-3 spreadsheet package, the answer may be simple. Passwords in 1-2-3 are case-sensitive.

When retrieving a password-protected file, you must

enter the password with the same uppercase and lowercase letters used to create it. This is a common reason for the error message "Invalid Password."

Information provided by Corporate Software, Inc., a Westwood, Mass.-based software reseller.

Release 3.0

spreadsheet engine?

King: Release 3 core code is used in some of the products. It's a core set of functionality that ports. It is the basis for the IBM joint development that we're doing [1-2-3/M].

On the other hand, G [1-2-3/G] is a separate development. It doesn't share that same core engine. G is really engineered from the ground up for Presentation Manager.

So this wouldn't affect the timing of 1-2-3/G?

King: That's correct. They're independent developments.

Could 1-2-3/G actually ship close on the heels of Release 3.0 so a user could choose either an MS-DOS or OS/2 version of Release 3.0, or go whole-hog and use 1-2-3/G for the Presentation Manager?

King: We're really building a spreadsheet family. We have Release 2.0 for the 8088, 8086 XT-class machine. We've said we're going to keep that valuable asset and enhance it.

Release 3.0 is really for the 286 class of machine, where there's 640K up to a couple of megabytes. There are a lot of machines being built today with that capability, and basically those machines can either go DOS or OS/2.

And G is really aimed at the higher end of the marketplace, machines that are 286, 386 with the higher megahertz and Presentation Manager environment. There, we're finding — and a lot of customers are finding — that it requires 5M to 6M bytes of memory to start to do interesting stuff. So these three products are aimed at the three tiers of the PC marketplace, and therefore we intend them all to be in the marketplace simultaneously. We also intend to provide upgrades so if a customer goes from an XT-class machine to an AT-class machine, or goes from an entry 286 to a high-end 386, they can upgrade.

What will Lotus do to convince customers who may be teetering a bit to stay in the Lotus family?

Manzi: We don't find a lot of teetering going on. We find people looking at competitive products. But since January, worldwide, our sales organization has been in front of about 370,000 customers talking about Release

W. Frank King

3.0. We're not seeing any wholesale shifting in that terrain at all. People are extraordinarily pleased with what we're doing and with what we're showing them and are hooked into the strategy across the PC base.

That would include things such as Blueprint — the data access specification — Lotus Extended Application Facility and then a whole evolution up to multiple platforms, which adds the ability to do cooperative processing?

Manzi: Yes. It's also important to remember that, you know, while we're doing this, everybody still thinks Release 2.0 is the best spreadsheet on the market. *PC World* just voted it that

way with their user survey, and NSTL [National Software Testing Laboratory] just voted it that way. So what we're really doing is competing with ourselves.

Some interesting things, such as graphical interfaces and spreadsheet-linking products, are now coming from the 1-2-3 add-in makers. Are you expecting that to continue?

Manzi: We really are. We help and work with and encourage those companies. Have you seen the quality of output that you get with the new Funk Allways [a new spreadsheet publishing add-in]? That is useful to us and keeps the product really valuable.

Are you going to be shipping the beta version soon, so people will have an idea of where you are and how this thing is moving?

King: We had a workshop with about 25 customers a couple of weeks ago. They brought their files and worked with the product, so we're already doing that to some extent.

What beta means to us is that the product is really ready to be productive in an environment where customers normally oper-

ate. We're not going to do that until we get the product to the level that we need it to be.

But we are already working with customers here at Cambridge so that they can use the product, test its compatibility, see the function, and the reports are uniformly great.
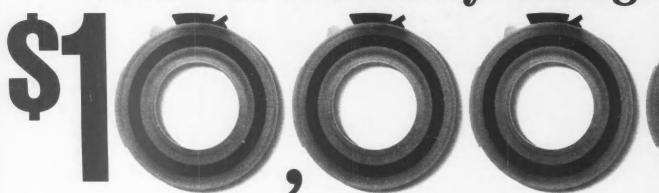
As you move some of the code back from C to assembler, does that make the job of porting it to other environments more difficult?

King: No. The way we do that is that the base code is all written in C. And then when we move it to a DOS or OS/2 environment, certain code, 5% to 8%, gets written in assembler. When you move it to the IBM MVS environment or the IBM VM environment or to a Unix environment, it is a different set of code that gets rewritten to whatever the local assembler is.

But the base is all kept in C. The common library is in C. We do all the development there and then just incrementally tune to the specific operating environment. That is a major breakthrough of this development.

I don't know of any piece of code in the world today that you can possibly find that runs on VM, MVS, DOS, OS/2, Unix and

also a couple of others.

Will you either add or trim features?

King: We are not going to add or trim. What we're really doing is focusing on the bugs and the product tuning.

How does this affect specific products such as 1-2-3/M, 1-2-3/Mac, 1-2-3/Unix and the Lotus/DBMS strategy?

King: The Lotus/DBMS strategy is built on the platform that is the set of code that runs on top of the OS/2 Presentation Manager. That platform is shared with a collection of tools that includes the spreadsheet, database tools and some other tools. But that's all an independent effort. So that whole strategy and that whole platform and the tools that run on it are parallel independent development efforts.

And Blueprint is not dependent upon Release 3.0?

King: That's correct. Blueprint is an architecture, and we're implementing it a variety of places, including the DBMS tools.

Is there any sense for when people should begin gearing up for DBMS?

King: We haven't announced any dates there. We have that product running very nicely, though.

What about the other products? 1-2-3/M, 1-2-3/Mac and 1-2-3/Unix?

King: A key point that we feel about Release 3.0 is it is such a large development activity. It is 339,000 lines of code. It is not something that is clonable by any of our competitors. It's going to set the base for a long time to come. It's a level of investment and development sophistication that is not going to be matched.

It is worth the wait?

King: Yes. And it's an investment that only a company with the resources of a Lotus could do.

What has Lotus learned from this experience?

Manzi: We've learned that when you start a process that is trying to define the world of software in the future, both from the technology standpoint and the usability standpoint, maybe it will take a little more time than we thought. We need to be a bit more smart about how we assess those things. And clearly it behooves us to keep some of the information about timing to ourselves.

Problem

strophic event that information center managers appreciate the need for setting up and following guidelines for developing their own applications, Daniels noted.

As more personal computers are linked in networks and connected to mainframes, the need for information center managers to establish guidelines for end-user applications development becomes particularly acute.

Thomas Samson, ▪ partner with Heidrick and Struggles, Inc., a consulting firm based in Dallas, noted that there are three phases in the evolution of end-user computing.

In the first phase, PCs enter the company as stand-alone machines, he said. "If end users are developing their own applications, they are for their personal use and not likely to have much of an impact on the rest of the company," he said.

In the second phase, in which several end users are developing applications for themselves and their departments, operational controls begin to take on importance. In the third phase, in which end users are developing applications using LANs as platforms and sharing data and appli-

cations on the networks, controls must already be firmly in place, Samson said.

Despite the potential for problems that can arise from allowing end users to develop their own applications, information center managers seem reluctant to curtail the work.

Standards, but . . .

Information center managers typically have standards for purchasing software and supporting applications. However, few of them are tackling such issues as the circumstances under which end users can develop their programs, how those programs are to be documented and who has responsibility for maintaining end user-developed applications, according to Dave Douglass, editor and publisher of "IC Strategist," a newsletter covering information center management.

"You have to be conscious that it can be a problem and set parameters to control it," said Gregg Brown, systems manager at United Telephone of Ohio in Mansfield. "But you can control it only so much."

End users who have a high level of technical ability can develop applications that meet their specific needs and go beyond what the information center can provide, he said.

The trend is to provide end users with as much computing power as possible, Brown added.

"We do not discourage them," Argonne Labs' Slade said. "Our role is to educate end users about making adequate documentation, backups and maintaining system quality."

"Overall, I think that the benefit of end users developing their own applications outweighs the problems that it causes," Union Pacific's Duke added. "It makes them more self-sufficient, and they get the answers they need faster, especially with the smaller applications."

Guidelines from information center managers for managing end-user applications development, according to "IC Strategist," include the following:

• End users who write applications are responsible for supporting them.

• If the information center supports end user-developed applications, end users must provide proper documentation for their applications according to documentation standards.

• Applications written for departmental use, or those that take more than two person-days, must be reviewed and tested.

• End users' adherence to development standards must be audited regularly.

Expert system

neering, reduced the number of administrative and referral meetings in one school by more than 50% and received rave reviews from school administrators and faculty members, Haynes said.

CAPER is a family of 14 expert systems, each with two components. The first component, the problem analyzer, defines the pupil's problem in the classroom setting.

"The problem may be that the student does not speak English, is impoverished, does not read well, is not motivated, does not do homework or is withdrawn," Haynes explained. "It can be hard to figure out what the problem is [without CAPER], particularly because standard tests are not valid for students that do not speak English. In fact, the tests are not valid for the student who is not a native speaker."

The strategic selector

The second component, called the strategic selector, offers suggestions for resolving the problem as well as guidelines for steps to take in the referral process. Sometimes the solution may be as simple as recommending a change in seating assignments so that students are seated with more compatible classmates or recommending a reading program that includes oral discussion.

"The system may make the teacher aware that if the child is very inattentive in class that hunger could be the problem," Haynes said, "or alerts the teacher that the child may be acting this way because it is normal in this child's culture. A lot of emotional problems are due to cultural differences, and the system sensitizes the teacher to this fact."

No cure-all

The system does not handle every sort of problem; it is designed to resolve problems related to reading, classroom behavior and language and cultural differences. Problem-solving components for math, study skills or motor skills, for example, will be added later if additional funding can be found to develop the system further.

Haynes and her colleagues began developing CAPER in October 1985 after receiving a grant for funding from the U.S. Department of Education. Work on the project began when Haynes was a research associate with the Institute for the Study of Exceptional Children and Youth at the University of Maryland's Department of Special Education.

During the first year, the CAPER team validated and tested modules of the expert system with teachers, administrators and other education experts. The completed system was installed at test sites in elementary schools in the Washington, D.C., area in January. The system, which can be configured for the characteristics and educational objectives of different schools, is also currently undergoing testing at school systems in Pennsylvania.

CAPER runs on an IBM Personal Computer XT or faster class of personal computer with 640K bytes of random-access memory and a hard disk drive. One advantage of using Knowledge Engineering System as the shell for developing this and other expert systems is that it can be ported to a wide variety of platforms ranging from PCs to mainframes.

Symbolics releases Mac board

BY JULIE PITTA
CW STAFF

CAMBRIDGE, Mass. — Symbolics, Inc. has introduced an add-in board for symbolic processing applications on Apple Computer, Inc.'s Macintosh personal computer.

Under a reseller agreement with Apple, Symbolics will market the Motorola, Inc. 68020-based Macintosh II with the add-in board and specialized software consisting of LISP code that runs on Symbolics' Ivory processor and C code that runs on the Mac.

The Macivory system features a Mac II with 1M byte of random-access memory, a mouse, a 12-in. monochrome monitor and a 300M-byte hard disk drive with a small computer systems interface. The complete system, including add-in board and software, is priced at $21,900 and is scheduled to be available by year's end.
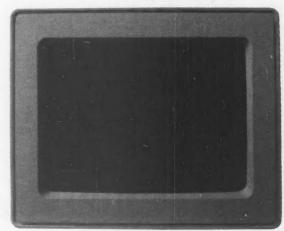
Symbolics will also sell the board-set and software. The price of the board set is $10,900; it is scheduled for shipment in March 1989.

Macivory can run existing Mac software packages and Symbolics applications including Joshua, a software product that builds and delivers expert system applications; Concordia, an artificial intelligence product for hypertext document development and delivery; and S-Geometry and S-Dynamics, which were designed to create and animate two- and three-dimensional images.
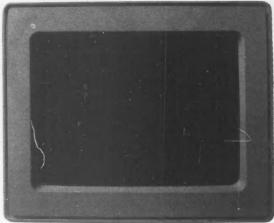
Howard Cannon, vice-president of marketing for Symbolics, said Macivory is the company's first PC-related hardware product. Its only other PC-related product is Cloe, an applications development tool for Intel Corp. 80386-based microcomputers.

The Mac was selected as a platform because of its appeal to Symbolics' customer base. "If you look at the markets we play in, those customers are more interested in the Mac than the PC," Cannon explained. "It provides us an easier penetration."

What you've been doing.

On your 286,
you've been making any task look complicated.

On your 386,
it hasn't been incredibly exciting having all that power.

If the screens on the right look more intriguing to you than those on the left, you're ready for Microsoft® Windows.

Windows opens up the world of visual thinking to all 286 and 386 owners by offering the power of graphics.

Everything you can do on your PC, you can now do better, faster and with greater imagination. Whether you're creating documents or trying to get a clearer picture of your work.

What used to take complicated keystrokes can now be accomplished with the simple click of a mouse. With Microsoft Windows, you access pull-down menus. Simultaneously work with different programs as well as cut and paste between them to create graphic examples within different bodies of text. And what you see on the screen will appear on your printed page.

And once you've learned Microsoft Windows, you'll have the basis for scores of other programs because all the countless new Windows applications are based on the same easy, logical format.

Since Microsoft Windows virtually looks and works like MS® OS/2 Presentation Manager, you won't have to worry about it becoming obsolete in a couple years. We made both systems compatible. So, *Stop playing with ancient instruments.* in the future, you'll *Now cutting and pasting is a simple point and click* be able to share *with the Microsoft Mouse.* data between them. And your knowledge of Windows will give you a jump on learning MS OS/2 Presentation Manager.

You'd expect a program this powerful to require a more powerful machine. But we consistently create software that makes

Barney

it ships this summer."

"But, LDC, you promised I'd have it by now."

"Well, Joe, it's worth the wait. And believe me — no one else has got it either."

"They'd better not. Say, can I have just a peek at what I'm missing?"

"Sure, Joe. You can look all you want. Just don't touch the keyboard."

It's no wonder User Joe slips out at night to play with the "easy" packages, like Excel. This is getting painful.

Small is beautiful. Ever wonder why

all this great software *Computerworld* keeps writing about hasn't arrived? The answer is simple. The software vendors are putting too much effort into the products.

It sounds stupid, but like so much in this industry, it's true. It used to take a couple of people in a garage, two tons of sausage pizza and a pond full of Pepsi to develop ground-breaking software.

Now these same packages are being enhanced by teams of well over a hundred programmers, fueled with fancy E-mail, Brie cheese and Perrier. Add to that far too many marketing people gathering checklists of functions that users absolutely do not need, and schedules stretch out into eternity. And they wonder why it won't fit in 640K bytes.

Will software ever catch up with hardware? With this approach, no way Jose.

Can the pompous open letters. Anyone who subscribes to high-priced industry-insider newsletters must have noticed a disturbing trend. Once these folks start getting quoted as experts, they feel beholden to give computer bigwigs advice. That's OK. God knows, these people need the help. It's just that the form of advice is getting a bit irritating.

Instead of just giving advice, these newsletter writers pen open letters to the likes of IBM's Bill Lowe and Apple's John Sculley. In these missives, the newsletter writers give their readers the same advice as the recipient. But Bill Lowe or

John Sculley won't get this advice that "may well save their companies" unless they subscribe to the newsletter. If this advice is so great, why haven't the boards of directors of companies like IBM and Apple hired these guys to run their outfits?

Recently, I met with an "industry figure" and mentioned that someone had written him an open letter. Because he had been traveling, most of the world read the letter before he even got to it. Talk about an invasion of privacy.

You know why these open letters are growing out of control? It's just one more way to save on postage.

EISA irritation. As if IBM wasn't bad enough, a famous board maker now has a few gripes with the way Extended Industry Standard Architecture members work with third parties. It seems that in order to develop boards for this new bus, vendors will have to pay $2,500 and sign a confidentiality agreement. Under this agreement, any inventions or ideas that board makers come up with automatically become property of EISA. So much for an open system, and so much for creativity.

Compaq does it too. While Compaq beats up on IBM (someone's got to do it) for propagating an incompatible bus (Micro Channel Architecture), few realize that Compaq has been cranking out some different buses of its own. In fact, the new Compaq Deskpro 386/20E has a different memory bus from the firm's other 386 machines. As with the MCA, if you want to create a special memory board that takes advantage of this bus, it's going to take some effort.

Ain't so smart. How many computer journalists (who work for other publications, of course) does it take to start up a PC? Two: one to watch the machine, another to get help. That's why they're journalists and not information center managers.

Barney is a *Computerworld* senior editor, microcomputing.

CC:Mail

According to Davis, an estimated 950 users communicate across 10 LANs located in three buildings via CC:Mail. "Everyone's addicted to it," Davis said, attributing this to the system's ease of use.
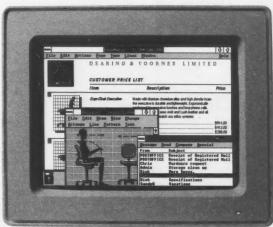
On the day he was interviewed, there were 1,000 active messages in the system, Davis said.

International Thomson Co., a $3.5 billion publishing company based in New York, uses CC:Mail to communicate with 26 offices around the world. Rich Spitz, manager of microsystems at International Thomson, said he was impressed by the ease with which graphics and files can be imported from other applications onto CC:Mail for transmission to other users.

"We used to use faxes, which are slow and sloppy, and an external mail service that was very expensive and slow," Spitz said.

Although he is pleased with its performance, Spitz said the price for CC:Mail with a gateway module is expensive at $1,295 per file server. The product costs $695 without the gateway.

Zachmann

based on Motorola, Inc.'s 68000 family of microprocessors have begun to challenge minicomputers and low-end mainframe systems. Stratus computers have even found their way into IBM's product line in the form of the IBM System/88.

More recently, Sequent has distinguished itself as a successful innovator pushing the capabilities of microprocessor-based systems into mainframe territory, with systems based on multiple Intel 80386 microprocessors. Sequent is now able to offer systems with processing power of more than 100 million instructions per second.

Looking ahead, Biin, a joint venture of Intel and Siemens, promises further advances in the use of a microprocessor foundation to build even more powerful systems. Biin will carry the attack of microprocessor-based systems into the supercomputer area of computationally intensive applications in addition to the area of large commercial systems.

Powerful, larger systems based on microprocessors are clearly starting to challenge what only a few years ago was the exclusive territory of big mainframes and supercomputers. At the same time, however, advances in the base technology are making even more inexpensive and smaller systems capable of taking on larger and larger tasks.

Full 32-bit processors like the Intel

> **B**IIN WILL CARRY the attack of microprocessor-based systems into the supercomputer area of computationally intensive applications.

386 and the Motorola 68030 are now commonly available in personal computers, making them capable of performance that was until recently available only in much more expensive dedicated workstations. New microprocessor architectures, many of them reduced instruction set computing-based (or RISC-influenced), as well as continued advances in the established Intel and Motorola architectures, promise to push even further into high-end systems territory in the years ahead.

The result is that traditional mainframes are a species as surely doomed as were the dinosaurs when a meteorite hit the earth 65 million years ago, kicking up a cloud of dust that ultimately changed the climate. The turbulent waters of the computer industry over the next few years are likely to sink many older ships long believed to be as unsinkable as the Titanic.

Zachmann is president of Canopus Research, a computer industry research firm in Duxbury, Mass.

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Radio Shack
COMPUTER CENTERS
A DIVISION OF TANDY CORPORATION

Flexible Grid laptop debuts

FREMONT, Calif. — Grid Systems Corp. has introduced a new Intel Corp. 80386-based laptop aimed at end users who need both power and flexibility.

The Gridcase 1535 EXP is a battery-powered laptop with a removable tray with two IBM Personal Computer XT and AT expansion slots for mass storage, communications and other plug-in boards.

The expansion slot will enable professionals in the field to configure the laptop for hundreds of applications such as converting the unit into an oscilloscope or adding optical disk drives, the company said.

The laptop, which weighs 16 pounds with the expansion tray, features a 40M-byte hard disk drive, 1M byte of random-access memory and backlit LCD.

Options for the unit include a gas plasma display, 2,400 bit/sec. internal modem and Intel 80387 math coprocessor.

The company said it will begin delivering the unit in December at $7,495.

Rbase aids

King County police believe the murder of 40 women and disappearance of eight others is linked to one perpetrator. Identification of many of the women, who were killed between July 1982 and early 1984, has been difficult because of their alleged "street life-style" and anonymity.

The crime-solving program, which is based on Microrim's Rbase System V, sorts through the dental data of hundreds of missing persons to find information that could match that of a victim. If there is a match, a dental expert compares the missing person's dental chart against a victim's teeth to make a positive identification.

The system is designed specifically for use in the Green River investigation but is flexible enough that it could be used to identify remains in the event of a natural disaster or similar emergency, Reay said.

Microrim is no stranger to law enforcement officers. The Los Angeles City Police Department used an Rbase application to store and compare data related to the "Night Stalker" serial killings. The Dade County Police Department in Florida uses Rbase to maintain 25,000 active warrants.

NEW PRODUCTS

Systems

A 10-MHz IBM Personal Computer XT-compatible machine has been announced by **Hyundai Electronics America.** The **Super-16TE** is an enhancement of the company's 8-MHz Super-16T and replaces that system as the product line's new low-end personal computer.

The Super-16TE is based on an Intel Corp. 8088-1 processor and includes 640K bytes of random-access memory. The system also offers five expansion slots, one parallel port and one serial port, a real-time clock and support for both 3½- and 5¼-in. floppy-drive formats. The product comes bundled with Alpha Software Corp.'s Electric Desk, an integrated software package said to include word processing, database and spreadsheet functions.

The Super-16TE is priced from $1,045 to $1,645, depending on system and memory configuration.

Hyundai Electronics America, 4401 Great American Pkwy., Santa Clara, Calif. 95054. 408-986-9800.

AST Research, Inc. has added a model to its line of Premium/286 IBM Personal Computer AT-compatible PCs.

The 10-MHz **Premium/286 Model 140V** comes standard with a proprietary 16-bit graphics adapter and 1M byte of random-access memory. The system also ships with a 40M-byte hard drive, one serial port, one parallel port and seven expansion slots, the vendor said.

The Premium/286 Model 140V costs $4,095.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714. 714-863-1333.

Advanced Logic Research, Inc. has introduced two Intel Corp. 80386-based computers designed to compete directly with Compaq Computer Corp.'s 386-20E machine, the company said.

The **Flexcache 25386DT Model 120E** and **Flexcache 20386DT Model 120E** run at 25 and 20 MHz, respectively. The zero-wait state systems have a 120M-byte enhanced small device interface (ESDI) hard disk drive with a 1-to-1 ratio interleave ESDI controller. An IBM Video Graphics Array card is available.

The Flexcache 25386DT Model 120E costs $7,590. The 20386DT Model 120E lists at $5,590.

Advanced Logic Research, 9401 Jeronimo, Irvine, Calif. 92718. 714-581-6770.

Software applications packages

EKD has announced a software program that reportedly will automate all of a company's business needs on an IBM Personal Computer or compatible system.

Business-in-a-Box can be configured to handle marketing, telemarketing, accounting, inventory control and production distribution functions, the distributor said. Features include a relational database, a menu system for accessing applications and a security system. The product requires 640K bytes of memory, 20M bytes of hard disk space, 300K bytes of free memory and a Hayes Microcomputer Products, Inc.-compatible modem. It may be used on local-area networks with as many as 30 active workstations.

Business-in-a-Box costs $999.

EKD, P.O. Box Y, Selden, N.Y. 11784. 516-736-0500.

Shopkeeper Software, Inc. has released **Shopkeeper M**, a multiuser version of its software package designed for medium-size retail operations. The package runs on a network of Apple Computer, Inc. Macintosh Plus, SE or II workstations.

Functions reportedly include sales, point-of-sale, invoicing, inventory, billing, accounts receivable, customer files, floor planning, cash drawer controls and other applications. The package will accommodate as many as 32,000 customers and 32,000 inventory items. The basic package includes one master program and two additional programs for remote workstations. Hard-disk storage and printing capabilities are required for operation.

Shopkeeper M costs $395.

Shopkeeper Software, P.O. Box 38160, Tallahassee, Fla. 32315. 904-222-8808.

Software Publishing Corp. has announced **PFS:First Publisher 2.0**, an enhanced version of its entry-level desktop publishing program.

The product incorporates all of the features in the original version and includes improved file import capabilities. The latest release is twice as fast as the original program and offers support for more than 70 different printers. The product will also accept scanned images, the vendor said. One hundred fifty clip-art images and a selection from the 150 available fonts are included with the package. The software runs on an IBM Personal Computer, PC XT or AT, Personal System/2 or compatible and requires a minimum of 512K bytes of memory.

PFS:First Publisher 2.0 costs $129.

Software Publishing, 1901 Landings Drive, Mountain View, Calif. 94039. 415-962-8910.

Marketing Graphics, Inc. has begun to ship **Publisher's Picturepak for Wordperfect 5.0**, consisting of libraries of business clip-art in Wordperfect Corp.'s .WPG vector graphics file format.

The collection reportedly consists of 565 pictures, titled the Eye Opener Series, and includes three editions, including: Executive and Management, Sales and Marketing and Finance and Administration.

The series is sold collectively for $250, and individual editions are available for $99.95 each.

Marketing Graphics, Suite 210, 4401 Dominion Blvd., Glen Allen, Va. 23060. 804-747-6991.

Lord Publishing, Inc. has introduced a software package for business owners. Called **Ronstadt's Financials**, the product is a financial budgeting and projection program that will run on IBM Personal Computers and compatible systems.

The package incorporates accounting and financial applications for several different industries including retail, real estate, manufacturing, professional services, wholesale distribution and contract services. The product can also be tailored to fit user specifications.

Ronstadt's Financials costs $399.

Lord Publishing, One Apple Hill, Natick, Mass. 01760. 508-651-9955.

Action Technologies, Inc. has announced **Version II** of its **Coordinator Workgroup** application software, designed to provide tools for writing, delivering and monitoring business communications.

Coordinator runs on IBM Personal Computer XTs and ATs and compatible workstations and supports Novell, Inc.'s Netware and Microsoft Corp. MS-DOS 3.1 and higher local-area networks, the vendor said. The product's user interface is based on IBM's Common User Access recommendations for Systems Application Architecture. Version II was developed to focus on the activities of a work group and provides multiple addresses, delegation, reminders and appointments. Electronic mail, scheduling and management features are included.

Coordinator Version II costs $495 for stand-alone workstations and $995 for a LAN file server supporting up to 10 workstations. Other configurations are also available.

Action Technologies, 11th Floor, 2200 Powell St., Emeryville, Calif. 415-654-4444.

Deerfield Systems, Inc. has introduced **Displayform II**, a microcomputer software package for forms processing.

The product reportedly can display a form on the screen in what-you-see-is-what-you-get format and can also set up forms for data entry. The package will accommodate both preprinted and electronically generated forms and merge information from Ashton-Tate Corp.'s Dbase III files. An IBM Personal Computer, PC XT, AT, Personal System/2 or compatible with Microsoft Corp. MS-DOS 2.0 or higher is required. A hard disk, a high-resolution graphic display card and a printer are also necessary for operation.

Displayform II costs $495.

Deerfield Systems, 221 Elizabeth St., Utica, N.Y. 13501. 315-797-1805.

Data Access Corp. is shipping **Office Works**, its group productivity software program.

The package consists of five independent modules designed to support various business activities including phone messages, document control, name and address database maintenance, electronic mail and time management. The software is available in both single and multiuser versions and runs on IBM Personal Computer, PC XT, AT or compatible systems with 640K bytes of random-access memory and 2.5M bytes of disk storage. The multiuser configuration can operate with Novell, Inc.'s Novell Advanced Netware 2.0 and higher and 3Com Corp.'s 3+ 11 and higher and other IBM Netbios-compatible networks.

The single-user version of Officeworks costs $195. The local-area network version costs $1,395.

Data Access, 14000 119th Ave. S.W., Miami, Fla. 305-238-0012.

Broderbund Software, Inc. has announced **DTP Advisor**, a Hypercard application for Apple Computer, Inc.'s Macintosh computers.

Designed for both entry-level and sophisticated desktop publishers, the product consists of two programs: a tutorial on the general elements of graphical design, and a project management system for graphical arts projects. According to the vendor, the software addresses several areas including layout, typography, preproduction and printing.

DTP Advisor is scheduled for release in the fall and will cost $79.95.

Broderbund Software, 17 Paul Drive, San Rafael, Calif. 94903-2101. 415-492-3200.

Macintosh products

A 21-in. gray-scale flat monitor for the Apple Computer, Inc. Macintosh II has been introduced by **Sigma Designs, Inc.** According to the vendor, **Silverview** can display from two to 256 shades of gray when used with several different display adapters.

The display screen features 1,152 by 860 pixels and offers a 72 dot/in. resolution. The product will be offered in three versions: **Silverview M**, a monochrome version that lists for $1,999.; **Silverview S4**, which provides 16 levels of gray and costs $2,499.; and the **Silverview S8**, which displays 256 shades of gray simultaneously and is priced at $2,999.

The company has also announced the **Colormax**, a 19-in. color display system also designed for the Macintosh II. A maximum of 256 colors may be displayed simultaneously. The monitor screen offers a display of 1,152 by 870 pixels and provides an 82 dot/in. resolution. Reportedly, the product is especially suited to engineering drawings, full-height documents and two-page spreadsheets.

The Colormax costs $5,299.

Sigma Designs, 46501 Landing Pkwy., Fremont, Calif. 94538. 415-770-0100.

Sigma Designs' *Silverview monitor*
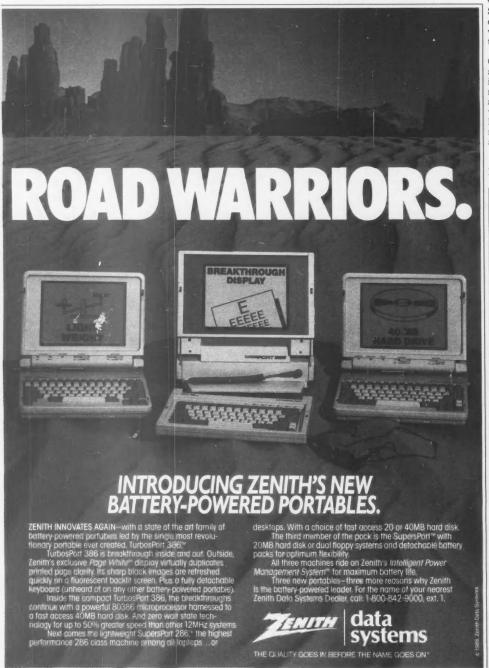
GCC Technologies, formerly known as General Computer Corp., has introduced the **FI/150** internal drive for the Apple Computer, Inc. Macintosh II system.

The 150M-byte hard disk incorporates Control Data Corp. Wren III drive technology and offers a 16.5-msec average access time. The product is shipped with all software, cabling and brackets and includes a full one-year warranty on parts and labor, the vendor said.

The FI/150 costs $2,499.

GCC Technologies, 580 Winter St., Waltham, Mass. 02154. 617-890-0880.

A multiuser application software that allows work-group editing on the Apple Computer, Inc. Macintosh machine has been announced by **Mainstay** of Agoura Hills, Calif.
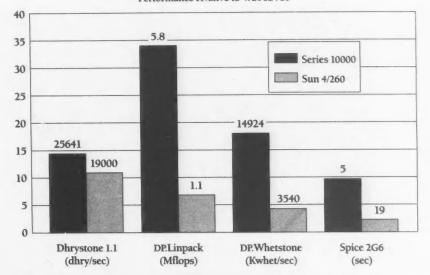
Called **Markup**, the product reportedly allows reviewers to mark up, highlight, expand reports, drawings, art and scanned photos. The software supports a physical work group on a network such as Appleshare as well as a logical work group

of dispersed members relying on disk or telecommunication transmission, the vendor said. The product is slated for retail channel distribution next month.

Markup costs $495 for a database and a two-user pack and $995 for a database and a five-user pack. Supplemental Markup user packs cost $195 each.

Mainstay, 5311-B Derry Ave., Agoura Hills, Calif. 91301. 818-991-6540.

Software utilities

Cypress Systems, Inc. has released **Turbo Apprentice** 4.0, a productivity tool designed to complement Borland International's Turbo Pascal, Release 4.0.

The product reportedly expands upon Borland's context-sensitive Help feature by offering support reference information for the user's units and procedures. The program automatically scans program and library files and indexes information. Users can then receive reference data on a designated item by pressing a Help key.

Turbo Apprentice 4.0 costs $25.

Cypress Systems, Suite 175, 11693 San Vincente Blvd., Los Angeles, Calif. 90049. 213-207-3938.

Software Connection, Inc. has released Version **4.0** of **DB Files**, a library of files designed to manipulate data, memo and index files while maintaining compatibility with Ashton-Tate Corp.'s Dbase III+ file structures.

Release 4.0 reportedly includes versions for Microsoft Corp.'s C and Turbo Pascal from Borland International. Source-code versions of the product are available for Microsoft's MS-DOS, Xenix, Unix and Digital Equipment Corp.'s VAX/VMS.

DB Files costs $99.95 for the single-user object version.

Software Connection, P.O. Box 712, Ely, Minn. 55713. 218-365-5097.

A DOS enhancement utility with built-in IBM Enhanced Graphics Adapter, Video Graphics Array and mouse support has been announced by **The Aldridge Co.**

Tree86 Version 2.0 eliminates the need to wait for reading-tree and drive information on single or multiple drives, the vendor said. The product reportedly reads up to 26 drives in memory and includes a context-sensitive on-line help function.

It runs on IBM Personal Computer, PC XT, AT, Personal System/2 and compatible systems and requires DOS 2.0 or higher.

Tree86 2.0 costs $89.95.

The Aldridge Co., Suite 575, 2500 City W. Blvd., Houston, Texas. 77042. 713-953-1940.

Mountain States Consulting has announced a DOS menu environment for IBM Personal Computers, PC XTs, ATs and compatible systems.

Called **MSC-Menu**, the product reportedly allows users to create their own operating environment by replacing the DOS prompt with intelligent custom menus. The program also provides unlimited menu nesting and linking and single- and multiple-command DOS. Requirements include DOS 2.0 or higher and 256K bytes of random-access memory.

MSC-Menu costs $29.95.

Mountain States Consulting, P.O. Box 20326, Jackson, Wyo. 83001. 307-733-1442.

Development tools

Watcom Products, Inc. has revised its integrated development system for IBM Personal Computer and Personal System/2 machines running under IBM PC-DOS or Microsoft Corp. MS-DOS.

Watcom C6.5 offers increased speed across a wide area of functions, including compilation, I/O, string manipulation and memory allocation, the vendor said. Several additional library functions have been added to the package, including a graphics library that is compatible with Microsoft's C5.0. A minimum 512K bytes of memory is recommended.

Watcom C6.5 is being offered at an introductory price of $295. Regular list price is $495.

Watcom Products, 415 Phillip St., Waterloo, Ont., Canada. N2L 3X2. 800-265-4555.

A microcomputer-based, computer-aided design software package modeled on Tektronix, Inc.'s Teknicad Plot 10 has been announced by **Cad Associates, Inc.** The product reportedly offers the same drawing capabilities as its mainframe counterpart and was designed to accommodate both the novice and expert user, the company said.

Called **Teknicad/PC**, the program runs on IBM Personal Computer ATs or compatible computers under Microsoft Corp.'s MS-DOS 3.1 or higher. Floating Point Systems, Inc. Floating Point co-processor support, an IBM Enhanced Graphics Adapter-compatible display, a minimum of 2M bytes on an extended memory card and a 20M-byte hard disk are required for operation.

Teknicad/PC costs $2,995.

Cad Associates, Suite 250, 5840 W. Interstate 20, Arlington, Texas 76017. 800-338-7147.

A software-based tracking system that allows software developers to protect programs without copy protection or altering existing source code is now available from **Az-Tech Software, Inc.**

According to the vendor, **Evertrak** thwarts reverse-engineering by preventing programs from being disassembled or run under a debugging system. It also re-

portedly allows the developer to place a secure alphanumeric serial string within the program and will build an expiration date into the software to limit the amount of time it can be used. The product runs on IBM Personal Computers and compatibles under DOS 2.0 or higher.

Evertrak costs $295.

Az-Tech Software, 305 E. Franklin, Richmond, Mo. 64085. 800-227-0644.

Training

An educational game designed to acquaint individuals with artificial intelligence and expert system concepts is available from **E-KE, Ltd.**

Called **E-KE,** the game consists of a deck of cards packed in a plastic case. The cards incorporate if, then, demon and decision categories and make use of forward and backward chaining concepts. Illustrations and a glossary of AI terms is included. The game is for ages 10 to adult and can have two or four players.

E-KE will be available in the fall at a cost of approximately $10.

E-KE, 301 Monteray Drive, Dublin. Ohio 43017. 614-792-9944.

A videotape training program for users of Wordperfect Corp.'s Wordperfect 5.0 is now available from **Learn-PC Video Systems.**

The program teaches beginning, intermediate and advanced skills and is available in all video formats, the vendor said. Three videotapes, three guidebooks and a practice disk are included.

A VHS- or Betamax-formatted Learn-PC Wordperfect 5.0 tape costs $895. A ¾-in. U-Matic tape version costs $1,045.

Learn-PC Video Systems, 5101 Highway 55, Minneapolis, Minn. 55422. 800-532-7672.

Board-level devices

Creative Solutions, Inc. has announced four interface boards that were designed for users of Apple Computer, Inc.'s Macintosh.

The **HDPR** (Hurdler Dual Ported RAM Interface) is intended for VME, STD Multibus or other remote chassis with a dedicated CPU and allows simple high-speed communication between a Macintosh II and an external system. The HDPR is available for $299.

The **H2CS** (Hurdler Two Channel Serial Board) reportedly uses the same interface chips found on the motherboard of the Macintosh II and includes a compatible driver in read-only memory (ROM). An on-board Motorola, Inc. 68008 microprocessor supports rates as fast as 1M bit/sec. The H2CS costs $249.

The **HPB8** is an interface-to-Opto-22 PB8 eight-channel I/O panel that provides digital control and sensing of eight AC/DC signals. It includes a Mac II interface board and all required cabling for connection to the Opto-22 board. The HPB8 costs $199.

The **HMbus** is a Nubus-to-Metrabus interface board that includes digital and analog opto-isolated relay racks and multichannel analog I/O. The HMbus costs $299.

The vendor will also provide existing Hurdler clients with the **ROM Development System,** a set of software tools that reportedly provide MPW source code and script examples of drivers written by Creative Solutions that may be used as templates for ROM creation. The software costs $149.

Creative Solutions, Suite 12, 4701 Randolph Road, Rockville, Md. 20852. 301-984-0262.

AST Research, Inc. has released an enhanced software product for the **Advantage/2-386** memory board with optional I/O capabilities for the IBM Personal System/2 Model 80 computer.

The company has added the **Astemm** expanded memory manager to the Advantage/2-386 package to provide support for expanded memory. The software reportedly permits a user to utilize linear memory as expanded memory when running application programs, such as Lotus Development Corp.'s 1-2-3 Release 2.0 and 2.01, or operating environments like Microsoft Corp.'s Windows 2.0. The system provides up to 8M bytes of 32-bit-wide memory on a single card. Two optional I/O modules are available — one with two serial ports and one with one serial and one parallel port.

The Advantage/2-386 with Astemm software costs $1,095 with 1M byte of memory and $7,335 for a 4M-byte-memory version. The I/O modules cost $345 each.

AST Research, 2121 Alton Ave., Irvine, Calif., 92714. 714-863-1333.

STB Systems, Inc. has announced two board-level products for the IBM Personal System/2 Models 50, 60, 80 and compatibles.

The **Serial 2** is a fully programmable asynchronous serial adapter with two RS-232C serial communications ports and is compatible with the IBM Dual Async Adapter/A. the vendor said. The board provides a programmable bit/sec. rate generator which allows operation from 50 to 19.2K bit/sec. and supports 5-, 6-, 7- or 8-bit characters and 1-, 1.5- or 2-stop bits. The Serial 2 is available for $239.

The **Serial/Parallel 2** was designed to function as a basic two-port I/O adapter and incorporates one RS-232CD asynchronous serial port and an industry-standard parallel port. It also includes a programmable bit/sec. rate to 19.2K bit/sec. The Serial/Parallel 2 costs $259.

STB Systems, Suite 210, 1651 N. Glenville, Richardson, Texas 75081. 214-234-8750.

Data storage

Emerald Systems Corp. has introduced two **half-height cartridge tape drives**, available in 60M- and 150M-byte capacities.

According to the vendor, the drives can be configured to run on local-area networks, DOS and Xenix systems. The units incorporate all of Emerald's proprietary tape features, including ASP software in DOS and LAN configurations for ease-of-use and unattended backup. Running under Xenix, the drives use all standard Xenix utilities, according to the vendor.

The 60M-byte internal drive costs $1,295; the 150M-byte internal drive is available for $2,095.

Emerald Systems, 4757 Morena Blvd., San Diego, Calif. 92117. 619-270-1994.

A 150M-byte internal 3½-in. tape backup system designed for IBM's Personal System/2 series is now available from **Maynard Electronics Co.**

Maynstream 150 reportedly enables users to transfer an entire cassette of data in 24 minutes and runs across all models of the PS/2 series, including the Model 50 and all three versions of the Model 70. Features include an electronic automatic tape tension control, direct drive tape motors and read-after-write capabilities.

The product uses a standard D/CAS-85 format and works with most local-area networks, the vendor said.

Maynstream 150 is priced from $1,600 to $2,000.

Maynard, 460 E. Semoran Blvd., Casselberry, Fla. 32707. 407-331-6402.

A tape subsystem for data archiving in an 8mm format is now available from **Brainwave Systems Corp.**

Dubbed **Data Historian**, the product reportedly offers 2G bytes of storage capacity and is offered on a variety of platforms, including the IBM Personal Computer, PC XT, AT, Personal System/2 and compatible systems.

Security, fault tolerance, data verification and key menu functions are included. An optional programmer's library and the Universal File Format for data record and file management are also available.

Data Historian carries a price of $5,995. Brainwave, Suite 3, 3400 Industrial Lane, Broomfield, Colo. 80020. 303-466-6190.

Flexstar's *solid-state Winchester simulator*

Flexstar Corp. has announced the **FS501 Winchester Simulator**, a solid-state unit that characterizes controller performance and calibrates disk-drive test equipment for correlation of disk-drive performance.

According to the vendor, the unit is self-calibrating and devoid of mechanical or temperature-induced aberrations.

It electronically simulates disk-drive read/write functions as well as frequently encountered mechanical, electronic, environmental or media-related faults.

The product ensures full parameter systems testing and analysis of all 3½- and 5¼-in. Winchester disk drives with industry-standard enhanced small device interfaces.

The FS501 costs $2,995.

Flexstar, 606 Valley Way, Milpitas, Calif. 95035. 408-946-1445.

A high-speed 5¼-in. write-once read-many optical disk subsystem is now available from **Maximum Storage, Inc.**

Designated the **APX-4000**, the 500M-byte subsystem was designed for the IBM Personal Computer and compatible market.

The unit has a reported average access time of 28 msec and a reported data transfer rate of 5M bit/sec. A version is also available for interface to Sun Microsystems, Inc.'s Sun-3 workstations running under SunOS, the vendor said.

The APX-4000 is available in either external- or internal-mount configurations and is priced from $4,250 to $4,450.

Maximum Storage, 5025 Centennial Blvd., Colorado Springs, Colo. 80919. 719-531-6888.

Storage Dimensions, Inc. has unveiled two personal computer hard-disk subsystems that allow 651M bytes of data storage on a single hard drive.

The two internal models, the **Speedstor AT650E** and the **Lanstor LAN650E**, each mount in a standard peripheral bay in the host computer and provide full support for both Microsoft Corp. MS-DOS applications and Novell, Inc. Netware servers. Both are supplied with the necessary enhanced small device interface controller and menu-driven utility software.

The AT650E costs $7,395, and the LAN650E is priced at $7,495.

Storage Dimensions, 2145 Hamilton Ave., San Jose, Calif. 95125. 408-879-0300.

Peripherals

A 14-in. color monitor that reportedly offers compatibility with the IBM Personal Computer, PC XT, AT and Personal System/2, as well as the Apple Computer, Inc. Macintosh II, has been announced by **Hyosung Computer.**

In addition to these systems, the **Maxiscan Color Monitor** reportedly will support AT&T's 6300 machines, Olivetti & Co. Olivetti M24 and 28 models and compatibles.

According to the vendor, the monitor has an 820- by 620-pixel maximum resolution, and text processing is available in green, amber, cyan and white on blue. An infinite color palette is available in analog mode.

The product costs $679.

Hyosung Computer, Suite 285, 710 Lakeway, Sunnyvale, Calif. 94086. 408-733-0810.

Several terminal emulation products for Digital Equipment Corp. and Data General Corp. operating environments are now available from **KEA Systems Ltd.**

The **ZstemPC-D400** reportedly emulates the DG D400, D200 and D100 terminals and runs on the IBM Personal Computer, PC XT, AT, Personal System/2 and compatibles.

The product offers support for both normal and compressed character spacing, and three file-transfer options are available: ASCII, Kermit and Xmodem.
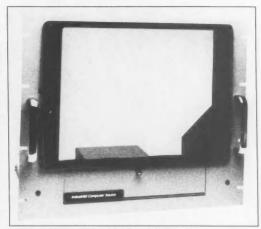
A minimum configuration requires 256K bytes, a serial port or internal modem, an IBM Color or Graphics Adapter, Video Graphics Array or Enhanced Graphics Adapter and one floppy drive with Microsoft Corp. MS-DOS 2.0 or higher. ZstemPC costs $160.

The vendor has also reconfigured the **Zstem 240** and **Powerstation 240** product line to include Digital Equipment Corp. VT340 emulation capabilities.

Version 2 will feature an 800-by 480-pixel display and Kermit server-mode support. According to the vendor, both units allow IBM PCs, XTs, ATs, PS/2s and compatibles to communicate with DEC PDP-11 and VAX systems.

Zstem 240 emulation software costs $295; the Powerstation 240 package with a standard keyboard is $435.

KEA Systems, Suite 412, 2150 W. Broadway, Vancouver, B.C., Canada. V6K 4L9. 800-663-8702.

Industrial Computer's *Multisynch-RM*

A rack-mount kit designed for the NEC Corp. Multisync-II monitor is now available from **Industrial Computer Source.**

The **Multisynch-RM** requires 1¾-in. of rack space and is 16 in. deep with the monitor installed. The product was developed to provide users with an easy method of installing the NEC monitor in a 19-in. rack. No modifications are necessary for installation, and handles are included as a standard feature.

The Multisynch-RM costs $350.

Industrial Computer Source, Suite 208, 5466 Complex St., San Diego, Calif. 92123. 619-279-0084.

Ampex Computer Corp. has announced upgrades for its **Ampex 232** VDT. Enhancements include Digital Equipment Corp. VT100- and ANSI-emulation capabilities, a parallel printer port and a revised personal computer keyboard.

The Ampex 232, designed for the PC multiuser marketplace, is still available in the original ASCII format. The unit is offered with the VT100 emulation, parallel port and IBM Personal Computer AT keyboard at no additional cost to the regular retail price of $554. An enhanced RT keyboard is available for an additional $5.

Ampex, Computer Products Division, 401 Broadway, Redwood City, Calif., 94063. 415-367-2011.

Ehman Engineering, Inc. began shipping its 105-key **ADB Extended Keyboard.** The product was designed for users of Apple Computer, Inc.'s Macintosh II, Macintosh SE and Apple IIGS systems.

According to the vendor, a keyboard macro software package — Quickeys from CE Software Co. in West Des Moines, Iowa — is bundled with the keyboard to allow users to customize the product.

Features include 15 function keys, six page-control keys and an 18-key numeric keypad.

The ADB Extended Keyboard costs $199 and carries a full one-year warranty.

Ehman Engineering, 97 S. Red Willow Road, Evanston, Wyo. 82931. 307-789-3830.

NETWORKING

Why fear Novell?

Is "better dead than red" — as in Novell — the new watchword for Microsoft allies? Weighty objections from Bellevue, Wash.'s very put-out boy billionaire crushed last month's would-be strategic alliance between Ashton-Tate and Microsoft rival Novell.

An angry Bill Gates reportedly bludgeoned good buddy Ashton-Tate with threats of a lawsuit and his ability to withhold some proprietary code vital to a joint SQL server project. You might say the alliance really got Bill's temper rocking, which is not surprising, since Gates is determined to wrest control of the LAN market away from Novell.

A development triumvirate consisting of Ashton-Tate, Sybase and Microsoft is building an SQL data base server. Sybase is supplying the engine, Microsoft is adapting the technology to OS/2, and Ashton-Tate is supplying Microsoft with some technology as well as building a front end using Dbase IV.

The strange thing about all this is that Microsoft may have cut off its nose to spite its face. The company is naturally concerned about Novell's SQL Server. The deal with Ashton-Tate would have resulted in Novell's support and distribution of the Sybase Server, redirecting its own SQL efforts into some sort of administrative

ISDN waiting on applications

NTT speakers see '90s implementations, but not without practical use

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — Integrated Services Digital Networks (ISDN) hold plenty of promise as the next generation of communications, but fancy technology will go nowhere without strong applications, according to players in major ISDN markets speaking at the Nippon Telegraph & Telephone (NTT) International Symposium 88 held here Oct. 3-4.

"We have to develop uses [along with] the technologies," said Kazuhiko Gotoh, senior vice-president of NTT Telecommunication Networks Laboratories. In April, NTT launched a nationwide ISDN network in three metropolitan areas; the

network has spread to 26 cities.

Keith E. Ward, chief engineer at British Telecom PLC, agreed. He said that the European community's integration in 1992 could be a key date for proliferation of ISDN networks, because members want their networks to operate in harmony.

Other key elements

"But compatibility of ISDN terminals and networks does not necessarily mean the service will take off and grow," Ward said. "It's like having a personal computer on your desk without a spreadsheet or word processing program. It's the applications that will make it work."

British Telecom's initial 80K bit/sec. ISDN was introduced in

1985, before international standards were set. In early 1989, the company plans to upgrade that offering to a 144K bit/sec. Basic Rate Interface and 2M bit/sec. Primary Rate Interface service conforming to CCITT recommendations.

Another key to making the

Inside

- Tops jumps into E-mail market with Inbox purchase. Page 62.
- Satellite link putting stars in NASA, NSF eyes. Page 63.
- Synoptics rolls out two hosts. Page 70.

IBM, DEC support questioned

BY PATRICIA KEEFE
CW STAFF

NEW YORK — In the past three months, users have been pleasantly surprised by the one-two punch of multivendor service offerings by IBM and Digital Equipment Corp.

But the real surprise may lie in whether both vendors — long resistant to supporting nonproprietary equipment — can actually pull off this promised turnabout.

Analysts said these proclamations of open-arms support for

Centralized net management tops corporate concerns

BY ELISABETH HORWITT
CW STAFF

Centralized network management is important; multivendor less important; and voice/data hardly important at all, according to Fortune 1,000 data communications and MIS managers interviewed earlier this year by International Data Corp. (IDC), a market research firm based in Framingham, Mass.

More than 25% of the respondents said they intend to go with an internally developed network management system. Roll-your-own network management systems have been the norm for many years, the report said, because until 1987 most network management systems were for modem control.
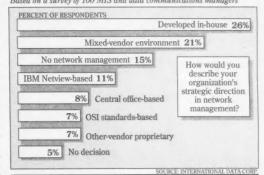
About 20% of the respondents said their strategic direction was toward a multivendor network management system. Approximately 8% of the respondents said their networks would be managed from a carrier's central office-based system. Only about 7% said their systems would be based on the OSI standard (see chart).

About 50% of the respondents said they currently use between one and three network management systems, while a little more than 30% use between four and six systems. About 2% use more than six systems, and about 10% have no system at all.

Network management was an "important" to "critical" criterion for choosing a networking

vendor for more than 75% of the respondents. In comparison, only 50% of the respondents cited multivendor network management as a critical or important issue, and 71% said that integrated voice/data network management was not important.

According to Kathryn Korostoff, an IDC analyst who wrote the report, one reason for the lack of voice/data integration is the fact that voice and data are still managed by separate organizations in many Fortune 1,000 companies.

Strategic directions in network management
Based on a survey of 100 MIS and data communications managers

PERCENT OF RESPONDENTS

Developed in-house	26%
Mixed-vendor environment	21%
No network management	15%
IBM Netview-based	11%
Central office-based	8%
OSI standards-based	7%
Other-vendor proprietary	7%
No decision	5%

How would you describe your organization's strategic direction in network management?

Tops seeks edge in E-mail arena

Hopes PC-to-Mac package will become LAN messaging standard

BY PATRICIA KEEFE
CW STAFF

ALAMEDA, Calif. — In an effort to get a jump on the emerging electronic mail market for local-area networks, Tops has purchased the Inbox personal computer-to-Apple Computer, Inc. Macintosh mail package from Symantec Corp. for an undisclosed sum.

By coupling Inbox technology with its LAN operating system, Tops is hoping to catapult into the driver's seat as the E-mail standard. Mail is the feature most requested by Tops users.

Tops, a division of Sun Microsystems, Inc., makes Tops software, which supports and links together three distinct environments: AT&T's Unix, Microsoft Corp.'s MS-DOS and Apple's operating system. Plans have been announced to support SunOS and Digital Equipment Corp.'s VMS operating systems.

LAN standard

The strategy here is to create enough momentum in the user and developer communities to position Inbox as the messaging standard for LANs in general, as well as between Macintoshes and the rest of the world. Toward that end, Tops has unveiled a three-pronged strategy.

First, it will create "instant market share" by seeding 400,000 Tops users with Inbox, which they will receive along with the next upgrade of Tops software sometime in the third quarter of 1989.

With a shipping rate of 35,000 to 50,000 nodes a month, Tops should be able to guarantee developers a million users before the end of 1989, claimed Rick Shapero, vice-president and general manager of Tops.

Second, the Inbox development team will come up with a new version featuring PC server support — important since Tops is increasingly becoming a PC-only network. Also, Tops will provide a developer's kit to enable third parties to write gateways for, and integrate applications into, Inbox.

Third, Tops and Inbox will become tightly integrated on a systems level. "We want you to be able to install Tops and automatically get mail," Shapero said.

"The crucial difference is to give equal functionality on all platforms," Tops product manager Helen Berry said.

Although Tops claims Inbox has twice the installed base of Microsoft Mail, that claim was disputed by some analysts, who suggested the reverse is true.

In any case, Tops' entry into the Macintosh E-mail market is expected to heat up competition among a handful of competitors: Microsoft's Mail, CE Software Co.'s Quickmail and 3Com Corp.'s 3+Mail.

Three market keys

There are three keys to this market, according to analysts: PC support, application integration and gateways to other environments, most notably CCITT's X.400.

Users need both gateways and the ability to send documents from within their applications, said Dave Kosiur, editor of "Connections," a Fullerton, Calif.-based newsletter on Apple networking. "Corporate users won't bother with any Mac-based E-mail packages that can't communicate with larger machines," he added, suggesting Tops may have a leg up here.

Strong relations with the third-party community — on which Tops, CE Software and Microsoft have said they will rely for a variety of gateways — are crucial.

> "CORPORATE USERS won't bother with any Mac-based E-mail packages that can't communicate with larger machines."
>
> DAVE KOSIUR
> "CONNECTIONS"

Tops said it will provide a Unix mail gateway itself but is talking with Softswitch, Inc. about providing an X.400 gateway.

Most of the vendors provide developer's kits, but Tops appears to be going a step further by tempting developer interest with hard numbers — that is, Tops' sizable installed base. Shapero cited a recent Infonetics, Inc. study that positioned Tops a mere 1% in market share behind 3Com in total LAN shipments.

"A lot of people are expecting a Microsoft-Sun war, and that's possible. Microsoft has considered messaging something to be very aggressive with, and we'd expect them to be very competitive," Shapero said.

However, he suggested Microsoft would have a hard time matching Tops' installed base. Noting that Microsoft is also an applications developer, he claimed it has tended to keep its Mail application programming interfaces under wraps.

But Microsoft has a few cards yet up its sleeve. Tops has its hands full at the moment, and Microsoft has promised to build hooks for Mail into its word processing and spreadsheet applications. Given the installed base of those applications, such support just might give Microsoft Mail the turbocharge needed to overtake the rest of the LAN E-mail market.

Satellite net fine-tunes database reception

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The National Aeronautics and Space Administration and the National Science Foundation have teamed up to create what is, literally, an astronomical network.

In a precedent-setting collaboration, NASA and the NSF recently established a satellite network link that will make it much easier for U.S. scientists to gain on-line access to the world's foremost database on astronomy, located in France.

The database, known as SIMBAD and residing at a data center south of Paris, enables an astronomer to look up detailed information about stars, planets and supernovas. NASA officials said the database, dating back to 1950, lists nearly all known information and technical papers about celestial objects.

International barriers

The problem is that U.S. astronomers have been hampered in their access to the database in the past. For one thing, NASA said, the standards of interconnection for French computer systems are different from those for U.S. systems and not all universities or research labs were able to connect easily.

Secondly, the dial-up connection to France was costing nearly $100 per connect, which is beyond the reach of all but a few astronomers, NASA said.

To solve these difficulties, NASA and the NSF acquired a satellite link between Princeton University and the Institut National de Recherche en Informatique et en Automatique (INRIA) outside of Nice, France.

INRIA has developed a gateway that translates between the Transmission Control Protocol/Internet Protocol used by U.S. research institutions and the CCITT protocols used by the French Transpack data service, according to Steven N. Goldstein, lead engineer at NASA's contractor, Mitre Corp. in McLean, Va.

INRIA is also providing a link between the satellite circuit and the Paris data center where the database resides, Goldstein explained.

Under the cooperative effort, the NSF has paid about three-fourths of the costs of a permanent network hookup, and NASA is underwriting the charges for database access and the remainder of the circuit costs.

Circuit cooperation

The circuits are being installed by MCI Communications Corp. and the French national public telephone and telecommunications authority, Goldstein said. The network is expected to be operational later this month, once a few minor glitches are ironed out, he said.

The Cambridge, Mass.-based Smithsonian Astrophysical Observatory — acting as NASA's agent for SIMBAD — will register U.S. astronomers, provide them with user manuals and passwords and make consolidated payments. SIMBAD is an acronym for the Set of Identifications, Measurements and Bibliography for Astronomical Data, a database maintained by the Centre de Donnes de Strasbourg, France.

NASA's interest in the network is to assist its community of researchers, while the NSF is mostly interested in developing protocols to translate between U.S. and European versions of the ISO Open Systems Interconnect protocols.

Excelan enhances VMS line

BY PATRICIA KEEFE
CW STAFF

SAN JOSE, Calif. — As was expected, Excelan, Inc. recently unveiled a key expansion of its Digital Equipment Corp. VMS product line: support for Sun Microsystems, Inc.'s Network File System (NFS).

The NFS product reportedly features file/record locking to allow Microsoft Corp. MS-DOS, AT&T Unix and VMS users simultaneous access to a file.

"DOS and Unix users shouldn't be asked to run a translation program just to access a text file under VMS," said Bob Davis, an Excelan product line manager. The NFS protocols provide users with access to almost limitless file space, he said.

In addition, Excelan extended its Local-Area Network Service for VMS to support DEC VMS 5.0 and said it had licensed startup TGV, Inc.'s Multinet, a host-based Transmission Control Protocol/Internet Protocol implementation for the DEC VAX/VMS environment.

Excelan's NFS support includes a distributed file system management utility said to simplify network management through interactive on-screen manipulation of NFS parameters. This utility allows network administrators to add new users just by filling in the proper information on the screen, Davis said.
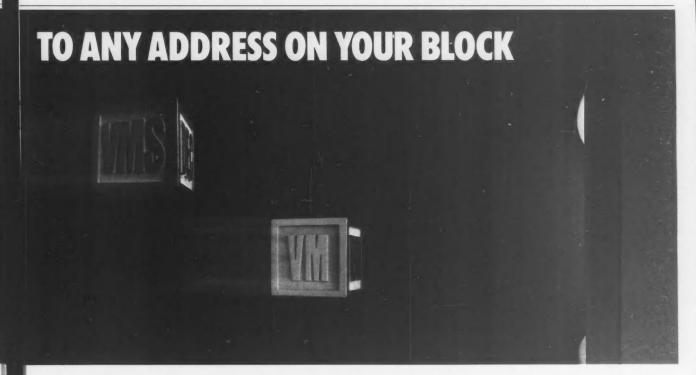
File format translation and file name mapping are done by the NFS server, which frees the user for higher level tasks.

LAN Service NFS is available as an addition to LAN Service for VMS; prices start at less than $3,000.

Release 3.5 of LAN Service for VMS supports VMS 5.0 and will be distributed free to all customers currently under warranty or service contract.

Multinet reportedly supports all VAX/VMS platforms, with complete VMS conversion compatibility from 4.4 to 5.0. It provides the standard suite of applications (Telnet, FTP and SMTP) and supports third-party programming through either a Queue I/O interface or its Berkeley 4.3 BSD socket interface.

Multinet prices range from $1,995 to $17,950, depending upon the VAX system.

Comten courts compatibility

Communications controller rollouts bring NCR subsidiary closer to IBM

BY ELISABETH HORWITT
CW STAFF

ST. PAUL, Minn. — Product introductions in the past two weeks have enabled NCR Comten, Inc. to boost its viability as a vendor of IBM-compatible communications controller products.

The announcements, which include a long-awaited Token-Ring connection and multivendor quick-switching capability, catch up to IBM in some important areas while also providing some added value, the NCR Corp. subsidiary claimed.

Comten announced Version 4.2 of its Advanced Communications Function/Network Control Program (ACF/NCP), which provides Systems Network Architecture (SNA) networking on Comten's communications processors for IBM mainframes.

The new version is compatible with IBM's ACF/NCP Version 4 Release 1 and Release 2; it provides some of the same functions, including Token-Ring and Netview support, Comten said.

Wish for a niche

As a third-party SNA vendor, Comten has had an increasingly difficult time finding niches that IBM has not yet covered and providing added value while maintaining IBM compatibility, according to David Passmore, a principal at Fairfax, Va., consulting firm Network Strategies, Inc.

"They do well with customers who are looking for competitive pricing, since you get more bang for the buck with Comten hardware," Passmore said. These latest announcements should help Comten hold its present market share, without providing any significant gain, he added.

"Comten will continue to provide IBM-compatible NCPs; we're still in the SNA business and intend to stay there," said Comten spokesman Linvel Karres. Comten plans to bring out its version of IBM's NCP Version 5 sometime late in 1989 and also plans support for IBM's recently announced capability of addressing up to 65,000 subareas in the same SNA network, Karres said.

Compared with IBM

The Token-Ring interface involves a direct connection to a Comten 369X, which can support up to 10 local-area network attachments, or a 5600 communications controller, which can support up to 20 LAN attachments, Comten said. In comparison, IBM communications controllers have an eight-LAN limit, according to Karres. Comten's Token-Ring interface can also

send Token-Ring traffic statistics and alerts to Netview.

Last week, Comten announced the Multi-Vendor Networking System, communications processor software said to allow 3270 terminals to hotkey among applications on multiple IBM and non-IBM hosts.
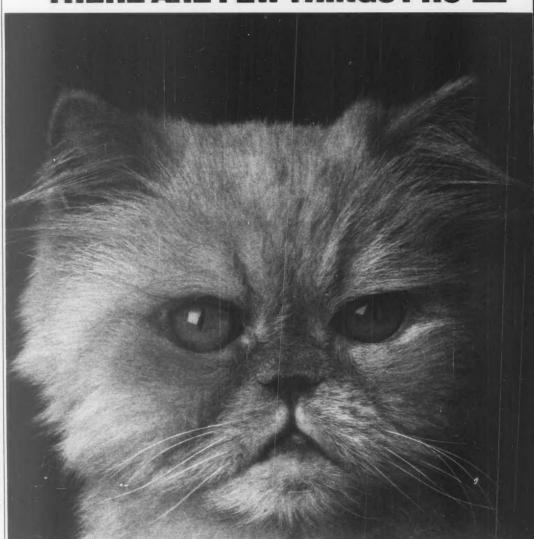
The software supports SNA, bisynchronous and remote lines. While IBM provides a similar capability in VTAM on the host, the fact that Comten's software resides on the front-end processor provides advantages such as minimizing host overhead, Passmore said.

Also, implementing the software on the network instead of the host makes it possible to connect terminals to multiple, multivendor hosts over X.25 and direct connections, said Comten

spokesman Greg Fahey.

The Multivendor Networking Facility resides on a Comten 369X or 5600 communications processor. Scheduled to be available in the second quarter of 1989, it has an annual license fee ranging between $2,640 and $7,920, depending on the communications processor, plus a $1,045 annual license fee for each host interface.

IBM, DEC

third-party equipment will depend heavily on whether the companies achieve two goals: execute agreements with capable third-party service providers and convince other systems vendors, including each other, to sit up and take notice when told,

"We've determined that it's your problem — fix it."

Today, when multivendor networks falter, users are often caught in a vicious cycle of finger-pointing among vendors. It is not clear how these service programs will avoid more of the same, although IBM and DEC insist they will.

One key problem, at least among the large systems vendors, is that none will so easily hand over control of a customer network, said analyst Jeff Kaplan, market researcher at Lexington, Mass.-based The Ledgeway Group. Loss of control could mean loss of sales, Kaplan commented.

"What we're seeing is an escalation of the battle for control over the customer network," he said. "Vendors are hoping to build a close, comprehensive relationship with customers beyond the single-product solution." Service support is seen as the glue that will bind customers to vendors, he said.

Moreover, end-user focus groups moderated by Ledgeway have revealed very little faith in vendor support services. Most group participants reported that vendors do not understand user needs, do not understand enough about their own equipment and refuse to address third-party equipment, Kaplan said.

The kicker is that large corporations are generally unwilling to relinquish control of any strategic system to an outside organization. The real target audience lies mid-pack, he said.

It was against this backdrop that IBM last month unveiled IBM Telecommunications Services, Network Support (TSNS), and DEC introduced its Integrated Support Services (ISS) and Service Alliances programs.

IBM's TSNS reportedly establishes IBM as a single point of service for voice and data networks involving IBM and non-IBM devices. It is also said to provide one-stop network problem determination assistance, from problem detection to fix verification, to the customer's Help desk from an IBM Network Support Center using Netview.

Options

An optional enhancement involves installation of monitoring and diagnostic probes on certain segments — typically critical network circuits — for problem detection and isolation and performance monitoring. Support of T1 systems is available.

Kaplan suggested the diagnostic probes are a repackaging of Pacific Spectrum's product and basically monitor only the wide-area portion and end nodes of the network. "The difficulty lies in getting to the LAN area; I think there's more fluff than substance here," he said.

IBM said it will isolate any problem calls to the responsible vendor, notify it of failing network equipment or communications facilities and coordinate its resolution efforts.

Affected third parties will cooperate with IBM because "all vendors try to provide the best service to the customer," said IBM Vice-President James Boyce.

Maintenance alliances

Also, under an optional Service Management plan, IBM said it will form alliances with maintenance vendors to provide hardware maintenance for the customer's prescribed coverage on selected non-IBM products. IBM will negotiate the terms and handle administration and vendor-invoice payments under the contract.

Within the defined network, data networks must have a designated IBM CPU, and voice networks must have an IBM/Rolm Business Communications System. The required equipment must be under IBM warranty or maintenance contract.

DEC's ISS program is also targeted at multivendor networks and is reportedly focused on planning, design, implementation and ongoing network management.

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N.Y. links up with Nynex group

BY ELISABETH HORWITT
CW STAFF

ALBANY, N.Y. — The New York State Office of General Services has chosen its regional Bell holding company to put together and manage a $180 million voice and data network that will connect some 100 state agencies.

New York state recently awarded the contract for a statewide network to a consortium of bidders that includes Nynex Corp., IBM and Eastern Microwave, Inc.

Empirenet will be a digital network that will support both voice and data transmissions among some 100 state agencies, as well as the New York State Lottery, according to state spokesman Tom Tubbs.

Besides providing more efficient data interchange, the private network should save New York about $15 million annually in operating costs — specifically "in telephone bills [we] won't have to pay any longer," Tubbs said.

While the cost savings are clearly a plus, the primary motivation behind the network was the fact that New York Telephone Co. is about to discontinue Group Channel Services, an analog equivalent of T1 networking that forms the basis for the state's current system, according to Bob Reinhold, senior project manager at Network Strategies, Inc. Network Strategies provided technical consulting during the contract request-for-proposals process.

New York Telephone will supply New York's intraregional voice and data connections at rates of up to 56K bit/sec. User equipment will access the lines via on-premise voice and data multiplexers, which will interface with Network Equipment Technologies, Inc. (NET) T1 switches located at the Bell operating company's central offices. Nynex is supplying the multiplexers, while IBM is supplying the NET switches.

Traffic speeds

While most state traffic will be at rates of 9.6K bit/sec. or lower, 56K bit/sec. lines will be used to connect state lottery retail outlets with the lottery's computers, according to Jesse Rosen, executive director at Nynex Information Solutions Group. Eastern Microwave will handle inter-regional traffic.

Nynex will act as systems integrator of the project. The company will also design, implement and operate the network control center that will provide network monitoring, diagnostics, trouble reporting and billing for Empirenet 24 hours a day, according to Gad J. Selig, a vice-president at Nynex Information Solutions Group.

The carrier plans to use a combination of its own software and IBM's Netview to perform monitoring and collect network data from the networking equipment, Selig added.

The Nynex group won the bid against AT&T, Rochester Telephone Corp. and a combined effort from MCI Communications Corp. and Racal-Milgo. New York chose the Nynex contingent because "it can provide the training, maintenance, installation and technology which is required, at the lowest cost," Tubbs said.

One attractive feature of the group's proposal, Tubbs noted, is that the state will not have to make any initial capital outlay. Equipment will be paid for over five years out of the operating costs of state agencies that use the network. Agencies will pay Empirenet "out of the money they save in phone bills," and Empirenet will then pay vendors, Tubbs said.

The one area Empirenet will not serve will be the capital district, which is already connected by Capnet. Implemented about two years ago, Capnet provides voice and data communications for all state offices in the capital district, Tubbs said. Users of the two networks will, of course, be able to communicate.

BIT BLAST

Borland joins growing CAS interface fan club

Borland International, Inc. recently joined the chorus of vendors announcing support for the **Communicating Applications Specification** (CAS) interface developed by Intel Corp. and Digital Communications Associates, Inc. Borland said it is implementing support for both CAS and Intel's new Connection Coprocessor board across several of its applications. Sidekick Plus will reportedly provide CAS support in 1989.

Along with the foliage, executive faces are changing at two communications companies this fall. **Retix Corp.**, a supplier of Open Systems Interconnect software, recently appointed Stephen Frankel president. He replaces Andy De Mari, who is now chairman and chief executive officer. James Lakin, formerly president of Contel Business Networks, Inc., has jumped over to **Globenet**, an interexchange carrier, where he serves as president and CEO.

The Telecommunications Industry Association named Patrick H. Williams director of government relations. He will coordinate efforts to lobby federal officials and agencies.

Having trouble keeping up with the new product avalanche? **Interconnect Data Systems, Inc.** in Anaheim, Calif., has unveiled a database of installation guides, product compatibility information and error-message explanations, as well as information on hundreds of personal computer networking products from a wide array of vendors. Users get monthly updates of the floppy disk-based Technical Encyclopedia of Computer Hardware and Software, which can be downloaded to a hard disk.

Advanced Computer Communications, Inc. has unveiled the ACS 9315, a high-speed hardware interface said to work with appropriate software on IBM MVS and VM hosts to link those mainframes with Ethernet local-area networks. It supports the IBM-defined Continuously Executing Transfer Interface protocol, which minimizes the number of mainframe Start I/O operations and I/O interrupts required to exchange data, resulting in greater IBM-to-Ethernet throughput. The ACS 9315 costs $19,000.

Digital Communications Associates, Inc. recently enhanced its DCA HLLAPI3 to support the vendor's entire line of PC communications products. HLAPPI3 is a software specification used to develop custom communications programs. It supports Distributed Function Terminal and Control Unit Terminal modes.

Tiara Computer Systems, Inc., a supplier of LAN cards and related software, said it is offering users a lifetime warranty for network cards — reportedly the first such guarantee. The warranty includes parts and service for Tiara's Lancard products for both Arcnet and Ethernet technologies. Tiara also said it is the first company to incorporate **Fujitsu Microelectronics, Inc.'s** advanced Etherstar LAN controller chip in network cards. The chip serves as the foundation for Tiara's new line of high-speed Ethernet cards.

Maxcom USA announced that its global telecommunications service, Maxlink, is now accessible to users of IBM's Professional Office System, Digital Equipment Corp.'s All-In-1 and Wang Laboratories, Inc.'s Mailway via bridge software from **Softswitch, Inc.**

The T1 interface for **Wellfleet Communications, Inc.'s** Link Node and Concentrator Node LAN-to-WAN Communications Servers has been certified as compatible with AT&T's Accunet T1.5 and Customer Controlled Reconfiguration services.
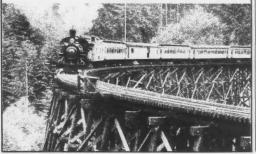
Using custom chip development and surface-mount manufacturing, **Ideassociates, Inc.** said it will introduce a half-card version of its IBM 5251 card next month that has only four chips. When originally introduced in 1985, it took more than 90 components to offer the same PC-to-IBM mid-range communications capability. The custom chips will also increase circuit performance by several orders of magnitude, according to the Billerica, Mass.-based company.

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server. But noooo.

Instead, we can look for Novell to support SQL Server anyway while working out a similar deal with SQL vendor Oracle. As for the embarrassed Ashton-Tate, an insider confirmed it will likely hook up with Novell competitor and LAN Manager co-developer 3Com.

"Look, Microsoft is very much afraid of Novell," a source close to all three vendors claimed. That's obvious, but I'm still not sure why. While Microsoft wants to be a key player in the LAN arena, its OS/2 efforts are targeted at the OEM market. Novell encourages developers to support its network, but the company's products are sold to end users.

Novell gets Microsoft's goat for being its usual prickly self. Dogged, perhaps, by a "not invented here" complex, Novell tends to be obsessed by performance and prefers to avoid licensing fees. To this end, Novell's Netware is based on a proprietary protocol stack and provides support for other protocols and standards via shells over Netware.

Getting the big boys to play

Of course, it's tough to set a standard if you can't get the leading player(s) in the market to play ball. But Novell doesn't hold all the cards here. It may have a grip on an estimated 50% of the departmental market, but that could mean nothing tomorrow. The fact is, the LAN market has barely been scratched — perhaps only as much as 5% of its potential.

Moreover, IBM and the rest of the industry will play a bigger role in determining the outcome of Gates' plans to redirect the course of desktop connectivity. If Microsoft can continue to pull in support from major developers and large systems vendors, then both IBM and Novell will have to support LAN Manager. Actions speak louder than words — even if they are loud, angry words.

But if Gates is really trying to set a standard, then why try to limit SQL Server to LAN Manager systems? The assumption here is that Sybase Server will become the premier SQL database, forcing users to move to LAN Manager. What if it doesn't?

The connectivity arena is replete with standards. But this is because no one magic formula that will do it all for all networks. A few key standards will emerge, and LAN Manager may well be one of them. But don't be too surprised if OS/2 networking ends up looking a bit like MS-DOS networking: three different solutions from three major camps — IBM, Novell and Microsoft/3Com.

It's a little early to tell who, if anyone, will be king of this networking hill. We're still waiting on IBM to ship LAN Server (next month) and spell out its LAN Manager strategy (hopefully next month). We're still waiting for robust OS/2 connectivity solutions from 3Com and Novell, both of which will ship OS/2 support in phases. Also playing a key role are IBM's Database and Communications Managers and third-party alternatives.

Until this stuff ships and users make their choice, it's anyone's ball game.

Keefe is a Computerworld senior editor, networking.

ISDN waiting

switch from today's analog networks to digital ISDN is the development of cost-effective adapters for terminals to use with the installed equipment base, according to Joseph Timko, an AT&T vice-president.

The lack of those boards has created a

> "I SDN MUST MAKE available everything the customer has now, and do so at a cheap price."
>
> GARY J. HANDLER
> BELLCORE

major barrier. Although major nations and players now follow the CCITT standard guidelines for ISDN, a manager with a major U.S. semiconductor company said his firm has counted 100 versions of CCITT ISDN worldwide, 20 of which are in the U.S. They exist because of huge loopholes in the ISDN definition, he claimed.

These 100 versions spell bad news for customers and chip makers. While customers fret over which version to buy, chip makers fear they will have to accommodate multiple ISDN versions in their interface circuits.

According to the manager, part of the

reason that Japan is two years ahead of other nations in getting ISDN to customers is that it has one standard fostered by NTT, a dominant market force here.

By contrast, the seven regional Bell holding companies have been running incompatible ISDN trials. "Most trials are not compatible systems, so they are not interconnectable," claimed Gary J. Handler, a vice-president at Bellcore, the research and development group owned equally by the seven regionals. "Customers don't like this. We are publishing a series of technical manuals to support a compatible ISDN architecture by 1990."

Handler added that the major customers are large U.S. businesses, for whom ISDN is still too expensive to deploy widely. "There must be value added for a customer to take on that expense," he added. "ISDN must make available everything the customer has now, and do so at a cheap price." He predicts ISDN will be popular in the U.S. by the mid-1990s.

Handler said there must be a lot more cooperation between terminal makers and communications suppliers as well, because it is still unclear how standard customer-premise equipment will be. In the U.S., the ISDN interface resides in each terminal maker's equipment rather than in the network.

These suppliers therefore must cooperate to assure compatibility of their equipment with a standard ISDN version and to trim the flavors of ISDN. "Otherwise, we might have to put a glove compartment into each telephone to handle all the needed documentation," he warned.

NEW PRODUCTS

Local-area networking hardware

Synoptics Communications, Inc. has introduced two host modules for its Lattisnet Premises and Department Concentrators.

The **Model 407 Unshielded Twisted Pair Host Module** incorporates a 50-pin Telco connector on the front panel that maintains an orderly cable assembly for wiring applications of 25-pair bundles of unshielded twisted pair, the company said.

The **Model 403 Attachment Unit** Interface (AUI) Host Module may be used in Lattisnet Model 1000 Premises Concentrators or Model 1010 Department Concentrators, the company said. The product is equipped with a set of link status indicators, one for each of the eight channels on the host modules.

The AUI cables run a maximum distance of 165 ft as specified by the IEEE 802.3 standard, according to the company.

The Model 407 is priced at $1,900; the Model 403 carries a price tag of $975.

Synoptics Communications, 329 N. Bernardo Ave., Mountain View, Calif. 94043. 415-960-1100.

A small computer systems interface (SCSI) **Hard Disk Installation Kit** that was designed for users of Novell, Inc.'s Netware 2.1 has been introduced by **Rancho Technology, Inc.**

The software reportedly provides users with concurrent I/O and is fully interrupt-driven. It is said to interface as many as seven SCSI disk drives and supports high-speed first-party direct-memory access data transfers. Netware fault tolerance and disk mirroring are supported.

The kit is available in several configurations and is priced from $199 to $245. The SCSI Netware 2.1 driver may be purchased separately for $45.

Rancho Technology, 8632 Archibald Ave., Rancho Cucamonga, Calif. 91730. 714-987-3966.

Local-area networking software

Platinum Technology, Inc. has enhanced **RC/Update**, its software tool designed for IBM DB2 users.

Version 1.3 is productivity-enhancing software that was specifically developed for the DB2 database administrator. The product assists DB2 specialists by significantly expediting the process of defining and changing any DB2 object of even the actual data items stored in a DB2 database, the company said. In addition, templates of existing objects can be used to expedite the definition of new objects.

New features include a data editor for manipulating data stored in DB2 tables and an edit and browse option for the selection of an entire or partial DB2 table.

RC/Update 1.3 costs from $375 to $900 monthly, depending on system configuration. Annual and perpetual pricing options are also available.

Platinum Technology, 555 Waters Edge Drive, Lombard, Ill. 60148. 312-620-5000.

Chronos Software, Inc. has introduced a work group computing program for people, projects and time management within a local-area network environment.

Called **Who/What/When Office**, the product coordinates employees on a network and gives them dynamic scheduling capabilities for both people and resources, the vendor said. The program will automatically check every entry for potential scheduling conflicts, and shared resources such as conference rooms and equipment can also be scheduled. The product reportedly runs as a server-based application on any DOS 3.1 compatible network operating system.

Who/What/When Office costs $695 for a 30-user, single-server site license and $75 for each manual.

Chronos Software, 1500 16th St., San Francisco, Calif. 94103. 800-777-7907.

Network management

The Sniffer, a network management tool that pinpoints problems and analyzes performance, now supports Banyan Systems, Inc.'s Virtual Networking Software (Vines) server product.

Developed by Network General Corp., the product is said to support more than 50 network protocols and systems.

According to Network General, developing network management software for Banyan's server was a major project, since the system supports a large number of protocols.

The Sniffer reportedly complements existing Vines network management software by evaluating, fine-tuning, debugging and troubleshooting Ethernet, IBM's Token-Ring, Arcnet and Starlan networks that use Vines protocols.

It also provides real-time monitoring of network traffic, including the types and number of interchanges that take place between different nodes during typical network activities such as file transfer or electronic messaging.

Called the PA-1309 Banyan Vines Protocol Suite, the software is available immediately for all models of the Sniffer and is priced at $1,995.

Network General, 1296B Lawrence Station Road, Sunnyvale, Calif. 94089. 415-965-1800.

Links

Multiwindow terminal emulation is featured in **Pacer Software, Inc.'s** latest release of its core Apple Computer, Inc. Macintosh-to-Digital Equipment Corp. VAX product. **Version 5.0** of **Pacerlink** includes a refined user interface that enables a Macintosh to concurrently interact with multiple VAX sessions, the vendor said.

Pacerlink communication to a VAX is accomplished via an asynchronous connection, Kinetics Corp.'s Fastpath Localtalk/Ethernet bridge, or direct Macintosh-Ethernet connection using cards from Apple, Kinetics, or 3Com Corp.

Pacerlink costs $2,000 per VAX system.

Pacer Software, Suite 402, 7911 Herschel Ave., La Jolla, Calif. 92037. 619-454-0565.

Sun Microsystems, Inc. has strengthened its offering of IBM connectivity products with the introduction of its color graphics IBM 3270 terminal emulator, the **Sunlink CG3270.**

The product reportedly emulates an IBM 3179G display terminal and enables Sun workstation users to access IBM host

mainframe applications, including those that use color and host graphics. The unit features a what-you-see-is-what-you-get keyboard-mapping utility and menu-driven file transfer capabilities.

Sunlink CG3270 is priced at $950 per terminal session, with discounts offered for multiple terminal-session licenses.

Sun Microsystems, 2550 Garcia Ave., Mountain View, Calif. 94043. 800-821-4643.

Advanced Computer Communications, Inc. has enhanced the **ACS 4020,** the company's CCITT X.25-to-Ethernet gateway. The company said that the product can now connect to Public Data Networks and has been certified for use on GTE Corp.'s Telenet and AT&T's Accunet.

The ACS 4020 allows as many as 49 devices on a Transmission Control Protocol/Internet Protocol Ethernet to share a physical port on an X.25 network. The product reportedly provides transparent connection between the two networks and can support data rates in excess of 512K bit/sec.

Multiple ACS 4020s can be connected between the same Ethernet and X.25 network to support load-leveling and redundancy, according to the vendor.

The ACS 4020 costs $10,950 and is available in either a rack-mountable or stand-alone enclosure.

Advanced Computer Communications, 720 Santa Barbara St., Santa Barbara, Calif. 93101. 805-963-9431.

Modems/Multiplexers

Burr-Brown's *FMX800*

A fiber-optic data multiplexer/demultiplexer has been announced by **Burr-Brown Corp.**

The **FMX800** was designed to provide a high-speed data link between remote buildings and a cluster of terminal computers and ports, the company said. The FMX chassis reportedly permits up to 16 ports and may be expanded to 64 ports.

All channels support full-duplex operations at the maximum RS-232/V.24 data rate of 19.2K bit/sec., and each trunk line may extend up to 3.5 km, the company said.

The FMX800 price tag begins lower

than $800 for the two-channel version.

Burr-Brown, P.O. Box 11400, Tuscon, Ariz. 85734. 602-746-1111.

Emucom, Inc. has announced the **EM-1910 Mono Pad/Modem Enhancer.** The product acts in conjunction with any standard V.32 modem to provide full, high-speed error correction out-dial X.32 capabilities, the company said.

The device is reported to be operational at speeds of up to 9.6K bit/sec. while maintaining the CCITT X.25 standard. No operator intervention is required. Basic features include an asynchronous packet assembler/disassembler that is fully compatible with 1984 CCITT X.3, X.28 and X.29 standards.

The EM-1910 costs $545.

Emucom, 25 Industrial Ave., Chelmsford, Mass. 01824. 508-256-9871.

A 32-channel, statistical multiplexer has been unveiled by **Micom Systems, Inc.**

Dubbed the **Micom Box Type 6,** the unit was designed to multiplex asynchronous and synchronous data simultaneously over a single leased line operating at speeds up to 19.2K bit/sec. or over a digital wide-band link operating at up to 72K bit/sec. The unit requires a single RS-232 or V.35 port and can be expanded with slide-in, 8-channel expansion cards.

The Micom Box Type 6 is priced from $4,320 for an 8-channel unit, which includes fixed command port and 72K bit/sec. composite interfaces.

Micom Systems, Simi Valley, Calif. 805-583-8600.

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NEC Information Systems, Inc., Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

Mitel Datacom, Inc. has added two statistical multiplexers to its existing line of communications products.

The four-channel **5204X** and the eight-channel **5208X** both support asynchronous data rates up to 19.2K bit/sec. and provide a 19.2K bit/sec. synchronous composite link, the vendor said. The multiplexers also accept an aggregate channel input of up to 76.8K bit/sec. and can be used over single-hop satellite links for international transmissions. An enhanced High Level Data Link Control protocol is integrated into the units to provide error-free, end-to-end performance.

The 5204X costs $1,195, and the 5208X is priced at $1,595.

Mitel Datacom, Suite 553, Hallmark Building, 13873 Park Center Road, Herndon, Va. 22071. 703-471-1000.

Raycom Systems, Inc. has announced another option for its 5100 Series Fiber Optic Multiplexer.

The **Current Loop I/O Module** is available in either passive (computer-end) or active (terminal-end) configurations, and each module delivers 36 channels through three 50-pin Telco connectors. All channels are said to support full-duplex operation. The product operates at 19.2K bit/sec. over distances of up to 1,500 ft.

According to the company, the primary benefit of the module is that users may now mix RS-232 asynchronous and current loop devices.

The Current Loop I/O Module costs $1,825.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301. 303-530-1620.

A fiber-optic time-division multiplexer that allows six to 12 subchannels to be multiplexed on a single cable in synchronous or asynchronous mode has been announced by **Rad Data Communications, Inc.**

Called the **FLM-2**, the unit reportedly allows users to choose individual transmission speeds — via a rotary switch — for each subchannel to be set on its own independent bit rate. Additional features include an internal selectable clock, internal and external loop-back and an integral modem.

The FLM-2 is available in either a desktop unit or a 19-in. rack mount and costs $665 for a four-wire twisted-pair configuration. The unit costs $890 for use with fiber-optic cables.

Rad Data Communications, 151 W. Passaic St., Rochelle Park, N.J. 07662. 201-587-8822.

Diagnostic equipment

Advanced Computer Consulting, Inc. has announced a software product designed to provide an alternative to dedicated serial analyzers.

Called **Serialtest**, the program reportedly allows a personal computer to be used for monitoring serial data communications between two devices. The software's features include pop-up menus and context-sensitive Help messages, and the product runs on IBM Personal Computers, PC XTs, ATs and compatible computers.

The system is targeted at engineers, software developers, system managers and field-service professionals, the vendor said.

Serialtest costs $495.

Advanced Computer Consulting, Suite 101, 700 Harris St., Charlottesville, Va. 22901. 804-977-4272.

An Integrated Services Digital Network (ISDN) software package that provides decoding facilities and emulation for the LAP-D protocol (to 64K bit/sec.) and the Signaling System 7 (SS7) has been announced by **LP Com**, a subsidiary of **Tektronix, Inc.**

The software will be shipped with all new orders of the company's TC 2000 integrated telecommunications analyzer. Combined with the analyzer, the product will reportedly provide an ISDN Primary Interface Analyzer with channel-drop and insert capabilities for any time slot that carries SS7 or CCITT X.25 data. The drop and insert feature also provides simultaneous DS1/DS0 analysis and full dual-line support, according to the company.

The ISDN software costs $22,490.

Tektronix/LP Com, 205 Ravendale Drive, Mountain View, Calif. 94043. 415-967-5400.

Atlantic Research Corp. has expanded its Interview test equipment line to include the new **Interview 20 Data Tester.**

The handheld device is said to provide data rates as high as 256K bit/sec. and include 128K bytes of nonvolatile random-access memory. The product was designed for field-service personnel, data communications technicians and installation crews, according to the company.

The Interview 20 costs $5,695.

Atlantic Research, Teleproducts Division, 7401 Boston Blvd., Springfield, Va. 22153. 703-644-9190.

Epson LQ-1050. Wide-carriage 24-pin; 264 CPS/draft; 88 CPS/letter quality. **Epson LQ-950.** Mid-carriage (110 column) 24-pin; 264 CPS/draft; 88 CPS/letter quality. **Epson LQ-850.** Narrow-carriage 24-pin; 264 CPS/draft; 88 CPS/letter quality. Optional single-bin cut sheet feeder available on all models. One year limited warranty, standard. Epson is a registered trademark of Seiko Epson Corporation. Epson America, Inc., 2780 Lomita Blvd., Torrance, CA 90505. **(800) 922-8911.**

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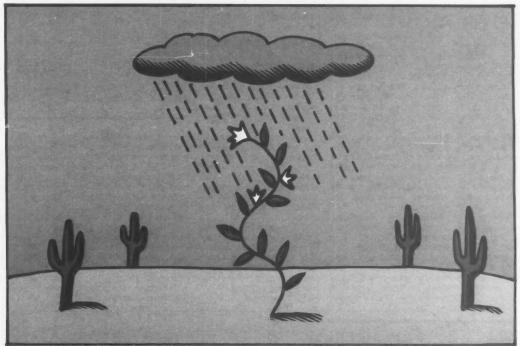
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ARTIFICIAL INTELLIGENCE

ANTHONY RUSSO

Sudden shower enriches MIS turf

BY J. SCOT FINNIE

Information systems managers are finally getting their chance to be consumers of artificial intelligence.

Vendors of a variety of artificial intelligence products, including expert system-based tools, are targeting MIS and data processing personnel as customers and end users.

Applications incorporating expert systems components are currently in development at several companies for mainframe performance analysis and man-

Finnie is a free-lance writer based in Stamford, Conn.

agement; capacity planning; network diagnosis and support; database design and maintenance; console operations; internal end-user technical support; software library management; and software generation.

John Popolizio, director of AI at New Science Associates, Inc.,

a market research firm in South Norwalk, Conn., predicts that the number of AI-based applications being developed for the data center will double in the next year.

At that time, the full breadth of products aimed at MIS shops, including database design tools,

will make up roughly 20% of an expert systems market that will total in excess of $430 million, he says.

Although few MIS-specific expert system-based applications have as yet reached the market, companies like Advanced Data Research, Inc. (ADR), Bachman Information Systems and Boole & Babbage, Inc. are leading the way in this area.

Dave Kuznia, formerly a senior systems programmer at Syracuse University in N.Y., put ADR's mainframe performance-analysis tool, Mindover MVS, to dramatic use. At the university, the DP department knew for some time that a bottleneck

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AI moves toward general-purpose languages. Page 82.

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New tools find decision-formation potential in databases. Page 86.

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existed in the system, but workers were unable to trace it.

As an afterthought one day, Kuznia tried Mindover MVS, which incorporates expert system technology, and wound up solving the problem — a need for added page data sets — in two hours. "The next morning," he says, "the executive director told me that other monitors of the system showed that the CPU was literally breathing easier."

Using Mindover MVS has also increased Kuznia's understanding of the MVS system, he says. He just installed the product at Mony Financial Services in Syracuse, where he currently works.

Crisis averted

By using Boole & Babbage's DASD Advisor, Carl Robison, data center supervisor at Morton Plant Hospital in Clearwater, Fla., avoided a shutdown of the hospital's new IBM mainframe. As operators carried out conversion from a previous mainframe system, they noticed a channel-capacity bottleneck brewing, a problem they were not expecting with the new computer.

DASD Advisor "alerted us to the situation early enough that we will be able to add new channels in time. If we had brought everything over from the old system without knowing, it's likely the whole thing would have just gone in the bucket," Robison explains.

Rather than creating stand-alone products, some vendors of conventional tools are beginning to embed expert systems as components of products.

Morino Associates, Inc., for example, is looking at Arlington, Va.-based Software Architecture & Engineering, Inc.'s Knowledge Engineering System shell as a development tool for applying knowledge-based technology to the areas of resource accounting and capacity management.

Bachman's DBA (IDMS) and Data Analyst personal computer-based tools, which incorporate both computer-aided software engineering and expert systems technology, also fit into this category.

At New Orleans-based McDermott International, Inc., an engineering firm, Mike Barefield, manager of data administration, uses these products to help design and implement Cullinet Software, Inc. IDMS databases.

DBA performs database revision, which involves moving from the data description language of the database structure to the physical level of schematic diagrams, perhaps to the conceptual level of iconographic representations, and back again.

After creating four databases in this way, Barefield sees paybacks in a couple of areas. He is now able to produce several iterations of a database in the same amount of time it used to take to create just the initial version. As a result of this refinement, the databases require much less maintenance.

Perhaps more importantly, the products help solve another problem. "It is very difficult to find qualified IDMS database analysts," Barefield says. "With these expert DBA systems, I figure I can get away with having one or two fewer human database analysts. That's a substan-tial payback."

In fact, the incorporation of expert systems in software engineering products is a burgeoning area. Transform Logic Corp. in Scottsdale, Ariz., has hired a staff of AI programmers to work out several aspects of the reverse-engineering product it is developing, according to Ron Davis, the firm's president and chief executive officer.

Cincom Systems, Inc. has embraced Aion Corp. as a member of its CASE Alliance Program and is offering ADS as a part of its full-life-cycle CASE and application development environment. As part of this agreement, Cincom will be customizing ADS to integrate it with its other products, according to Dennis Butler, senior product manager of application development technologies.

Mainly on the mainframe

Even as expert system-based applications companies target products at MIS/DP shops, many expert system shell vendors are shifting their marketing emphasis away from specialized LISP-optimized platforms and toward the mainframe.

Less than two years ago, only two well-known expert system development tools were available for IBM mainframe computers. Today, at least 10 such products exist, including several widely used workstation- and PC-based programs that have been ported.

With mainframe tools becoming readily available, more corporations are using development tools to generate expert system applications internally. In some cases, the expert systems being created are directly applicable to MIS/DP functions.

Chevron Information Systems in San Francisco, for example, has used Aion's ADS to produce an expert system for an internal network support application that, it is rumored, Chevron may decide to market.
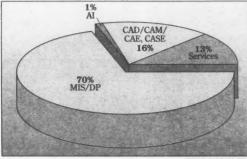
Another ADS user, Provident Life & Accident Insurance Co., headquartered in Chattanooga, Tenn., has developed an applica-tion that gives its MIS programmers a way to create and change program specification block (PSB) and program control block (PCB) commands in a much more simple manner.

Before the development of the expert system application, systems analyst Vicki Rozema says, the MIS systems people wrote all the definitions. Programmers filled out request forms describing what they needed done, and changes were entered once a week.

The expert system application "returns control to the IMS programmer and greatly increases the turnaround on PSB/PCB definitions," Rozema says.

More often, however, MIS shops are using development tools to create systems that offer knowledge-based support to other departments such as customer service, underwriting and manufacturing.

On the verge

AI vendors have not yet tapped the largest single market for computer services DP/MIS departments, which spend 70% of all hardware and software dollars

70% MIS/DP
16% CAD/CAM/CAE, CASE
13% Services
1% AI

SOURCE: DM DATA, INC.
CW CHART

At MCI Communications Corp. in Arlington, Va., for example, Dan DeSalvo, senior staff member in expert systems, is using AIcorp, Inc.'s KBMS to develop a customer-service support device. Known as Help desks, such applications are among the most commonly and easily implemented type of expert system.

IBM's Glendale Help desk shell — widely distributed with ESE, the company's expert system development product — was originally developed to *Continued on page 80*

A hand on the switch

Companies seek lights-out goal with expert systems

A strong synergy exists between automated operations and expert systems. The paybacks from expert systems in this area are as great as anywhere. Most observers place the average payback of a well-implemented expert system project at between three and seven times the initial investment. Some pundits have claimed the possibility of cost avoidance as high as 300 times that investment.

Even skeptics admit to a likelihood of at least a 50% payback, which is probably much higher than most companies expect from data processing automation.

For most MIS shops looking to explore expert systems, the goal is twofold, according to experienced users and consultants. First, the companies want to address some specific applications. Then, they want to move up the learning curve on building their own expert systems so they have the in-house capability to spot practical applications and deliver finished solutions.

The possibility of automating the data center environment so completely that humans are no longer required for most operations — termed "lights-out," or automated, operations — is exciting and controversial for most companies. Although experts caution that the reality is at least three to five years away at progressive companies and a decade or more for the rest, such statistics have not stopped some companies from gearing up for lights-out capability.

SEP's Genthon

Good starting point

MIS/DP-specific application products are a good way for MIS shops to test the waters, according to John Popolizio, director of artificial intelligence at New Science Associates, Inc., a market research firm in South Norwalk, Conn. Such products let MIS retain complete control of the expert system, he explains, and department members have an excellent understanding of the application.

In Europe, where there is an extreme shortage of qualified technicians to run big systems, companies like Societe Europeen Populisom (SEP) in Rungis, France, creator of the Ariane rocket, find that they must "use expert systems products rather than people wherever possible," notes Claude Genthon, head of systems staff. The problem is complicated by the firm's sociopolitical environment, which resists reducing manpower as a means of achieving return on investment.

While it is not close to achieving lights out, SEP has begun using an expert system from Paris-based Systar, Inc. The product, known in the U.S. as Daisy, is a performance analysis tool that works in conjunction with SEP's Unisys Corp. mainframes.

Texas Instruments, Inc. is considering several means of exploring automated operations. "We figure that in five years, we'll be there," says Pam Fales, knowledge engineer at Texas Instruments, Inc. "Data centers at many companies are trying to go lights out so they don't have 16 to 20 operators working during the week. But to get there, you need system monitors and expert systems working at several functions."

Like Digital Equipment Corp., IBM has so far released little in the way of expert systems aimed at MIS/DP customers, but it is actively developing in this area. It is concentrating on a line of 10 specialized tools being developed under what it calls the Automated Operations Joint Development Project. IBM has enlisted about 12 as-yet unnamed corporate customers to share the costs and benefits of the joint development effort.

According to Mark Steele, manager of knowledge-based applications at IBM, "The eventual goal of most of the customers we are talking to is to achieve lights-out operations. We don't expect to see that in the next couple of years. It is a complex subject. But we think the things we are doing in this project now will play a key role in getting us there."

The product line IBM is working on is designed to dovetail with its mainframe system monitor products. Specific functions include real-time performance management, performance analysis, problem reporting and documentation, problem analysis, batch job management, network management, storage management and a Help-desk diagnostic tool.

Most available expert systems for internal MIS functions are PC-based, but IBM's suite of products will be running in real time on the MVS or VM system. The company is also working on a system- or subsystem-restart capability to guard against lockout if the system fails.

Steele notes that performance was the main reason for putting these products directly on the mainframe. IBM expects to deliver many of the tools to its joint developers in 1989, with the balance to come in 1990. "Once they've been delivered to the joint development companies," Steele says, "then we will turn our efforts to making them available for general sale, hopefully not long afterward."

J. SCOT FINNIE

Shower

CONTINUED FROM PAGE 78

address a growing number of technical support questions from IBM's customers.

Pam Fales, knowledge engineer at Texas Instruments, Inc., is developing a Help desk-type system to support the Dallas-based company's Information Engineering Facilities division.

"It will provide the first level of support personnel with an expert system to help them answer more difficult questions. I think we will at least double, if not triple, the number of questions first-line operators can answer without having to seek out technicians or developers," Fales says.

In Philadelphia, an example of another kind of expert system-based mainframe tool was formulated by Cigna Corp.

Using Aion's ADS, Roger L. Schelm, vice-president of applied research and expert systems, oversaw the development of an application that provides group life and health insurance customers with detailed quarterly reports showing what their coverage is compared with the industry norm.

Provident's Rozema

Called MMI, or Medical Management Information, the expert system produces about 3,500 reports per year at a cost of less than $1 per report. Previously, Cigna had two employees who were solely devoted to this activity.

Talking to data

Free-standing expert system applications are only a small chapter in the emerging story, however. A major impetus behind the development of mainframe-based expert system development tools was the isolation of stand-alone expert systems from corporate data.

The next logical step was to permit users to enhance existing applications with knowledge-based components.

One of these products is Cullinet's newly announced Enterprise:Expert/MVS, a rules-based expert-system application development tool that is integrated with both the company's IDMS/R DBMS and its ADS/Online fourth-generation development environment.

According to Joe Carter, who heads up AI services at Chicago-based Arthur Andersen & Co., the determinants of success in expert systems are similar to those in real estate or retail: "With expert systems, however, instead of location, location, location, it's integration, integration, integration," he says.

The trend toward integration also, to some extent, indicates a maturation both in artificial intelligence-based products and in the way corporate customers regard them.

Companies interested in expert systems realize that this area is going to be as strategically significant a priority for them in the 1990s as the database was in the '60s, '70s and '80s, according to Tod Loofbourrow, a managing partner at Foundation Technologies, an expert systems development and consulting firm in Cambridge, Mass.

"[These companies] may have wanted
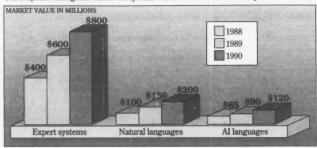
to get into artificial intelligence for some time, but the tools simply haven't been there," he says. "Now, they are finally beginning to see tools on mainframes that are of commercial quality."

What have vendors done to make their development products more attractive? Loofbourrow, who edits the James Martin Productivity Series report "Expert Systems and AI Toolkits," breaks the improvements into four categories: better performance, availability on existing business platforms, the ability to tap into commercial software in which corporate data usually resides and the potential to create corporate knowledge bases that may soon rival the corporate database.

Ford Motor Co. in Dearborn, Mich., is testing that potential. It has been

See them grow
The artificial intelligence market is expected to double within the next two years

MARKET VALUE IN MILLIONS

□ 1988
□ 1989
■ 1990

$800 $600 $400 — Expert systems
$100 $150 $200 — Natural languages
$65 $90 $120 — AI languages

SOURCE: DM DATA, INC.
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For example, American Airlines developed a PC-based expert system that helps maximize revenues by better managing its inventory of over 2,000 departures per day.

By effectively capturing and extending scarce human audit expertise, the Foreign Exchange Auditing Assistant developed by Chemical Bank has resulted in a 30-fold productivity increase.

The Commercial Underwriter's Environment developed by Swiss Re Services automates decision making by reviewing several screens of data, gauging the level of risk, and recommending whether potential clients should be insured.

involved in AI-based products for several years and has implemented Los Angeles-based Inference Corp.'s ART-IM/MVS, a new mainframe version of the company's expert system development tool.

Ford is part of a consortium of companies working with Inference; it also holds a small interest in the company. "Our involvement goes back a long way," points out Jim Cnossen, Ford's manager of manufacturing systems and operations research, "but what really excites us is the mainframe product. Getting expert systems on the mainframe opens up a whole suite of new applications."

One of those applications is the knowledge base, or repository, with which Ford is currently experimenting. By translating the logic behind a lengthy Cobol pro-

"ARTIFICIAL intelligence and expert systems are not yet beginning to catch on in business environments. Most MIS managers are taking a relatively cautious view toward this technology."

ROBERT ROUSE
WASHINGTON UNIVERSITY

gram into the rules of an ART-IM/MVS knowledge base on the mainframe, Ford is attempting to create an application that is part database, part language and part expert system.

The Cobol program, which has been in use for several years, handles financial transactions generated from outside companies. Maintenance of the program is difficult, time-consuming and manpower-intensive, notes Paul Duemler, project manager of artificial intelligence and expert systems support.

Duemler says he hopes to see many benefits in the company's repository application, including a reduction in the

maintenance effort and the time required to implement changes.

"Putting new policies in place with English-type rules should be much faster than recoding the Cobol; it will also make the new process more self-documenting, more auditable than the existing Cobol program," he says.

According to New Science's Popolizio, the concept of the expert system shell as a repository of data means that "you are not only going to store information, but you are going to have a semantic understanding of that information."

On the brink

While few users seem to have discovered them yet, there are other benefits of having new, sophisticated expert system tools on standard hardware, where it can interact with corporate data. Several vendors point this out.

At Digital Equipment Corp. in Maynard, Mass., R. J. Mathew, manager of information systems and AI information systems application marketing, is in charge of developing expert systems for MIS shops.

Like most vendors targeting the MIS/DP expert systems area, DEC has few, if any, products on the market yet. Its sole offering in this area to date is a VAX performance tool called VAX Performance Advisor. However, Mathew says he has several prototypes under development.

Cigna's Schelm

For one such application, called ICASE, or Intelligent Computer-Aided Software Engineering, DEC is using Nexpert Object, a development tool from Palo Alto, Calif.-based Neuron Data, Inc.

According to Mathew, Nexpert Object becomes a layer between a bottom level of the VAX's VMS interface and a top level consisting of "a highly interactive and graphical user interface — creating a sort of three-layer knowledge sandwich."
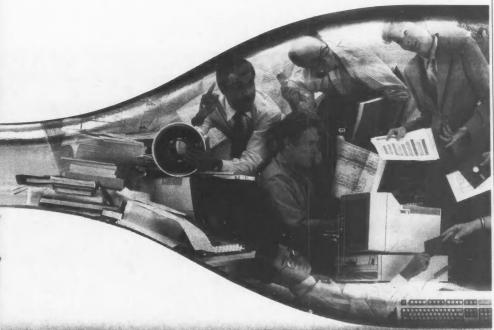
The structure of ICASE allows users to press a button and move from that program directly into Nexpert Object and back again, he says. "There is nothing to say that we couldn't extend that knowledge base to some area of VMS; it could be an envelope for all of VMS."

Such fluidity is not limited to the VAX. On an IBM mainframe, several products, including Nexpert Object — which was recently announced for that environment — and AIcorp's KBMS, are capable of automating the process of communicating with many software programs and languages, including Cobol, IBM's DB2 and SQL/DS.

Larry Harris, founder and chairman of AIcorp, says such shells are able to create a mediating layer in Mathew's "knowledge sandwich." While the layer has little to do with traditional concepts of expert system functions, it essentially gives MIS shops the potential to make SQL their standard data-manipulation language — a level of integration that most have not expected to be able to reach for several years.

Now and then

It is still far from a sure bet that all the direct attention currently being paid to MIS interests will pay off in major gains for the

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AI adapts to use of the vernacular

BY HARVEY NEWQUIST

During the mid-1980s, artificial intelligence — the sheltered child of research-based computer scientists for most of its existence — snuck out of the house and into the real world.

In its escape, however, AI brought with it more than its fair share of hang-ups imposed by its academic parents. The most notable aspect of this upbringing was a pervasive sense of snobbishness about which computer

WHAT HAS caused LISP, Prolog, OPS and a number of other AI-oriented languages to go from exalted to exhausted in less than 10 years? Plenty.

programming languages were considered apropos when creating an AI system or application.

Early discussions of the merits of languages approached religious fanaticism in two camps: those who preferred LISP and those who advocated Prolog.

Throughout the early and mid-1980s, these two AI language teams refused to believe that any other programming language could be effectively used for AI. To them, it was a given that either LISP or Prolog would ultimately dominate a world anxiously awaiting true intelligence in a machine.

Twist in time
Time has proven them wrong. Not only is Prolog all but invisible in the mass market today, but LISP itself is in deep danger of being sent back home to live with its academic parents. Why? One reason is that early vendors and developers failed to understand that the mass market was not going to convert billions of lines of Cobol, Fortran, Basic, C and other established languages into LISP or Prolog just because researchers said they should.

What has caused LISP, Prolog, OPS and a number of other AI-oriented languages to go from exalted to exhausted in less than 10 years? Plenty.

Neither LISP nor Prolog works very well on mainframes or most IBM-class computers. Early buyers of LISP found that, to run the software, they also had to buy a LISP machine with an average price tag of about

Newquist writes and consults on artificial intelligence and other advanced-technology topics from his office in Scottsdale, Ariz.

$100,000. Even then, a LISP-based application wouldn't work with any installed base of computer systems normally found in data processing centers.

After about four years of buying into stand-alone AI languages and the resultant systems, corporate users began to realize the fallacy of spending

hundreds of thousands and even millions of dollars for computer systems that couldn't be integrated into mainstream computer systems — primarily because LISP was used as a starting point.

In addition, the scarcity of LISP followers in mainstream computing made commitment to LISP technology increasingly difficult for both users and ven-

dors. A conservative estimate put the number of qualified LISP programmers in the world at fewer than 10,000 only a year ago. That is obviously not very many in comparison with the number of people doing Cobol, C or even Basic programming.

Since the end of 1985, when expert system developer Teknowledge, Inc.'s major shareholder, General Motors Corp.,

strongly suggested that Teknowledge start developing applications in C, many in corporate America have been saying no to specialized AI languages. As a result, many AI developers are recoding and rewriting their programs and packages to integrate into existing markets and software installations.

Even vendors of strict AI languages such as LISP, Prolog and

OPS are now willing to concede that the market for these languages is limited, composed mostly of scientists, engineers and researchers. The remainder want mainstream capabilities and are willing to sacrifice features for speed.

Today's AI products written in more traditional languages may not be as fully featured as their LISP or Prolog counter-

parts, but they run faster on mainstream architectures.

Not that LISP and Prolog are dead languages; quite the contrary. LISP is still one of the best symbolic representation languages ever created, and LISP machines are still exquisite computers. As for Prolog, it remains one of the most efficient tools for logic programming.

Special-purpose   machines

such as parallel processors and beefed-up workstations still provide a good environment for using LISP and Prolog in application-specific situations.

Furthermore, LISP is having something of a renaissance on micros. This is due almost exclusively to the introduction earlier this year of the Texas Instruments, Inc./Apple Computer, Inc. hybrid — the Explorer —

and last month's announcement by former AI heavyweight Symbolics, Inc. of its LISP board for the Apple Macintosh, the Macivory. (Ivory is the name of Symbolics' LISP chip.)

Why the Macintosh? Essentially because its interface closely resembles that found on most LISP machines or high-level workstations. In addition, the Mac II is constructed around the Nubus architecture, which was the foundation for TI's LISP machines in the early 1980s. Thus, it forms a natural evolution for

> **N**OT that LISP and Prolog are dead languages; quite the contrary.

companies that wish to have smaller but more general-purpose LISP machines for application delivery.

It is especially important to note that C and Unix have been winning big AI support, especially from Inference Corp., Neuron Data, Inc., Teknowledge and Sun Microsystems, Inc. TI even has Unix capability on its Explorer II machines. And though micros now make expert system development and delivery possible at all levels, this doesn't mean that specialized LISP machines will go away.

A new generation

Overall, a new generation of AI vendors — as well as a revamped generation of older vendors — is taking over the AI landscape.

Companies like Aion Corp., AIcorp, Inc., Neuron Data, 1st Class Systems, Inc. and even Apple, IBM and DEC are trying to put AI into the mainstream. Refocused companies like Inference and Teknowledge are taking the know-how that they've acquired in the AI business during the last six to 10 years — as well as knowledge about the pitfalls — and applying it to the concerns of MIS and DP departments throughout the U.S.

As companies like Apple, IBM, Cullinet Software, Inc., McCormack & Dodge Corp. and a host of other mainstream vendors get involved with AI, the choices for users will multiply. The options will range from the choice of hardware platform to the choice of language. AI will become less of a specific technology and more of an application enhancement tool, allowing users to create intelligent databases, spreadsheets and even inventory and payroll systems.

Perhaps the best option will be no option at all: an AI application so transparent and functional that the user does not know — or care — what language the program is written in. ●

Look to corporate databases for decision-making material

BY TOM SCHWARTZ

Corporate databases represent rich and largely untapped sources of raw materials for decision making. Typically, these databases contain a wealth of varied information, including histories of loan applications, employment records, computer logs and a host of other data types from which a frame-word for decision making can be generated.

Few organizations currently make full use of their corporate databases for this purpose. Instead, it is more common for a company to try to access decision-making capability by using statistical or tradition-

TODAY, THERE are a host of PC-based products incorporating induction, genetic learning and neural networking that can discern solutions to problems as contained in historical databases.

al expert system techniques.

Expert systems typically require extensive interviewing of a domain expert by an expert system analyst. The analyst takes the articulated rules for making the decision and places them in an expert system. In some cases, the amount of data is so overwhelming that statistical techniques are used.

While the expert system method requires considerable effort on the part of the domain expert and the expert system analyst, the statistical method calls for a lot of work to be performed by a statistician.

Today, however, there are a host of personal computer-based products incorporating techniques of induction, genetic learning and neural networking.

These techniques can be used to reduce the amount of human labor that is required for the task by discerning solutions to problems as they are contained in historical databases.

The savings that can be achieved with these methods are considerable. In instances in which measurements have been taken, a 90% reduction in human effort is common. Much of the expensive and time-consuming process of rule generation is automated.

A quick prototype can be generated, tested and validated and then quickly turned into a working application. All that is needed is a statistically valid historical database of information relating to the decision area, a user conversant in one of the advanced approaches, and a subject expert to do a reality check of the generated rule set.

In theory, applying these AI methods to the decision-making process is easy,

Schwartz is founder of The Schwartz Associates in Mountain View, Calif., a consulting firm specializing in technologies that utilize expert systems and neural computing.

but there is still some degree of difficulty involved in their use. Areas that must be carefully attended to include the following:

• **Problem selection.** The kinds of inquiries best suited to these approaches involve structured selection, in which the number of outcomes is limited; or mapping, a technique that involves finding correlations that exist between elements and outcomes.

• **Data set validity.** Since rules and decision-making criteria will be generated from the information the system receives, the number and types of cases used to reach a conclusion or test the quality of a conclusion must be statistically representative.

• **Representation.** With this class of tools, the key to a successful application is selecting the right attributes to represent the problem accurately.
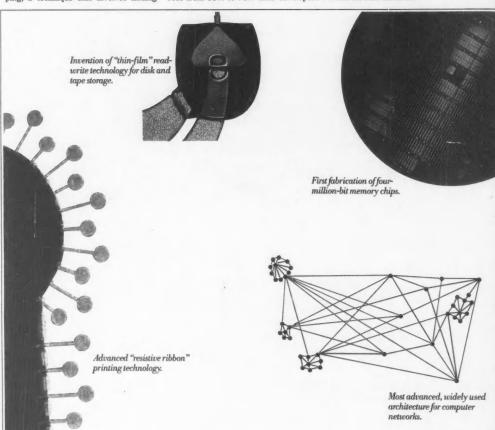
• **Additional data collection.** Most of the data saved by companies is done so for legal compliance, so some relevant data may be missing. In one case, the accuracy of a mortgage underwriting application rose from 53% to 78% after developers

added the gross national product and the inflation rate to the historical data set.

• **Ability to audit.** Since most inductive and genetic tools produce rules that are acted on by an inference engine, an audit trail and decision explanation are automatic. This is not true of neural networks, however. These products have not yet developed to the point at which they can explain how they got from the input to the output.

Keeping those caveats in mind, here is an overview of some of the available tools and current research.

Induction

Induction is a machine-learning technique that derives its decision-making capabilities from case histories.

Invention of "thin-film" read-write technology for disk and tape storage.

First fabrication of four-million-bit memory chips.

Advanced "resistive ribbon" printing technology.

Most advanced, widely used architecture for computer networks.

"What does all this do for me?"

Our customers are practical people. They believe in results. And so do we.

That's why IBM technology, like that pictured here, is intended to offer solutions to our customers.

For example, our customers can file billions of characters of information and retrieve three million characters per second, for a fraction of what it cost ten years ago—thanks to IBM's leadership in disk storage systems.

Customers using relational data bases, invented by IBM, can update and retrieve data simply by telling their computers what they want to do, not how to do it.

The earliest commercially available AI method of data extraction — an inductive algorithm known as ID3 — has served in the role of a foundation for at least a half dozen tools.

The easiest to use implementation of ID3 is found in 1st Class Expert Systems, Inc.'s 1st Class. The tool produces forward-chaining rules from the input cases. These rules take the form of a decision tree, which can be edited directly in the tool.

Last year, the company extended this feature in Fusion. This tool combines the capabilities of 1st Class with a code generator, allowing users to combine expert system technology with existing C or Pascal applications.

An enhanced version of this technique

I N GENETIC learning, rules generated at random are compared and ranked in descending order of merit, eliminated, reranked and retested until there is no improvement from one generation to the next in the correctness of the rule set.

is found in Intelligenceware, Inc.'s IXL, which combines an inductive method with other statistical methods. This product allows users to specify the importance of relationships and to commit resources to discovering rules that use an attribute based on that attribute's influence on an outcome.

The most popular induction-based decision-making tool on the market is VP-Expert from Paperback Software International. Available now for the IBM Personal Computer and soon to be available for the Apple Computer, Inc. Macintosh, VP-Expert uses the Kavanaugh Map, a method that reduces the logic represented in the cases to its simplest rule-based form.

Genetic learning is another method for deriving rules from data. In this method, rules generated at random are compared and ranked in descending order of merit, eliminated, reranked and retested until there is no improvement from one generation to the next in the correctness of the rule set.

There is currently only one commercial tool of this type available — Beagle, a knowledge-base generator from VRS Consulting, Inc. On the surface, genetic learning in the product is similar to ID3, in that historical examples are entered and rules are generated. However, ID3 learns by comparing an attribute with a constant, whereas Beagle compares and combines the values of attributes with other attributes.

By definition, Beagle is not an expert system, since it offers no inference engine. Instead, it can produce the rule set in Fortran, C or Pascal for embedded applications.

Neural network tools

One way of viewing neural network technology is as biologically inspired statistics. This capability is based on the ability of humans to associate incoming stimuli with similar, although not necessarily identical, stimuli identified through past experience.

Stephen Gallant at Northeastern University has developed a two-part neural network expert system, Dumbo and Macie, to meet the challenge of the neural network's inability to explain how the value of the data offered influences a decision.

Dumbo takes data and derives the knowledge base in matrix form, from which the decision-making capability is used.

Macie, or matrix-controlled inference engine, is the runtime and explanation section of the expert system. It combines the matrix generated by Dumbo with its own inference engine to form an expert system.

While not yet commercially available, Gallant's method has the potential to make the use of neural networks in knowledge acquisition more approachable and allow the network to explain its decision making.

Other companies that are commercializing neural network technology are additionally attacking the explanation problem in hopes of expanding their market. These firms include Neuralware, Inc., Nestor, Inc. and Hecht-Nielsen Neurocomputer Corp.

Commercial use

While these forms of rule generators are not well known, some are widely used. For instance, Du Pont Co. uses 1st Class and VP-Expert in a variety of diagnostic applications. In one case, the subject expert for a Mylar manufacturing machine tried to build an expert system using conventional rule-based expert system techniques and failed. However, with the help of these products, an example-based prototype was running in one afternoon.

"Mining" databases through the methods of rule generation described here may not solve all problems and cure all ills, but it does allow users to get a running start on building an expert system. While each of these processing paradigms requires substantial human-defined preprocessing to work, the effort inolved lessens with each improvement of technology. ●

Device with the densest "packaging" of high-performance computer logic.

Invention of most major magnetic disk technologies.

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That's IBM technology at work. IBM

There's reason beyond rules

BY SARA SPANG

The thousands of commercial expert systems that now exist represent only a sliver of the potential applications. Current commercial technology alone is rich enough to accommodate many additional applications. However, developments in programming techniques to represent knowledge and reasoning will considerably expand the scope of expert systems.

One major factor in the success of an expert system is how well the programming techniques used to encode knowledge and reasoning suit the application at hand. These techniques should match the way people really think and do a job or solve a problem. When the technical paradigm does not match the problem, a system will degrade quickly.

So far, most commercial applications depend on a limited set of techniques. The most common are systems in which knowledge is phrased in terms of rules, formal logical relations, frame- or object-oriented paradigms or combinations of the above.

There are, however, new paradigms of knowledge representation and reasoning on the horizon. These have just emerged or are about to emerge from the research world. Once commercially available, they will increase both the types of problems addressed by expert systems and the ease of programming.

Open a new window

Randy Davis, a professor at MIT's AI Laboratory, began looking for new modes of knowledge representation and reasoning in 1981.

As Davis saw it, traditional expert systems usually expressed knowledge in the form of rules based on empirical associations coming from experience with a particular task or problem domain. This approach makes the most sense for problems in which expertise really does consist of such associations. However, it can be limited if a problem exists in the absence of experts who have built up a repertoire of experience.

Furthermore, for many physical devices such as circuit boards, an entirely different type of knowledge is available. Since we know how these devices work and understand their structure and behavior, we can use this information to support a more powerful form of reasoning than one based on empirical association.

Davis uses an approach called model-based reasoning to express the underlying causal relationships among components of a device. When a system is developed based on a model of the device, it can reason not just by relying on empirical connections but by knowing "how things work."

During the past several years, Davis' group — and others at places like Xerox Corp.'s Palo Alto Research Center and Stanford University — have been developing model-based systems, focusing on

> **W**HEN A system is developed based on a model of the device, it can reason not just by relying on empirical connections but by knowing 'how things work.'

the design of circuit boards as an application area for this type of research. This work has been supported by Digital Equipment Corp., the Defense Advanced Research Projects Agency and Wang Laboratories, Inc.

A new company formed by several ex-Wang engineers, AI Squared, Inc. in Chelmsford, Mass., recently shipped its first commercial expert system application created with model-based reasoning.

According to Kevin Flood, the company's vice-president of business operations, AI Squared was approached with the idea of using the model-based approach to develop diagnostic systems for instrumentation and equipment in hospitals by Lewisville, Texas-based Medical System Support, Inc., a company that provides failure diagnosis of computers and medical instrumentation in hospitals.

AI Squared started with a diagnostic application for CAT scanners called Felix. In less than nine months, the company built such a system using Golden Common LISP to run on IBM's Personal Computer. It also ported the system to Lucid Common LISP to run on Sun Microsystems, Inc. workstations. Felix has just been delivered to the field sales force, and AI Squared is in the process of developing additional applications for Medical System Support. AI Squared is also looking for funds to start a marketing arm to develop its own products.

Xerox PARC in Palo Alto, Calif., well known for its innovative multidisciplinary approach to AI, is also forging ahead with research in representation and reasoning.

One major application area is the process of equipment design. Current efforts use techniques for reasoning by analogy along with model-based reasoning,

which seems to more closely approximate the mental process of design than do the rule or frame-based models of traditional expert systems. When human experts face a difficult design problem, they often look to analogous problems to find their solutions.

Xerox PARC researchers are looking at how a knowledge base of general design expertise could be used as a source of analogies when there are problems with a specific design. To do this, researchers are creating interfaces between the general and specific knowledge bases.

Makes world go 'round

In financial applications, Price Waterhouse is contributing to the search for new techniques for knowledge processing.

At its Technology Centre in Menlo Park, Calif., the Big Eight accounting firm has launched a major effort to incorporate AI techniques into the software systems it uses for its auditing, tax planning and consulting services. The goal is to improve the quality and efficiency of these services.

Although this charter may sound rather limited, the complexity and diversity of knowledge to be processed in these applications requires innovative research on knowledge representation and reasoning to make a significant impact.

Richard Fikes, principal scientist at the center, emphasizes that difficult technical problems abound in representing such knowledge. He and his project team must discover ways to represent the relative timing of events, describe an object from multiple perspectives and find alternative simplifying abstractions of complex descriptions and problem-specific default descriptions.

Fikes' group is currently working on a prototype of an international corporate tax planning system, from which new ideas for representation and reasoning are likely to emerge.

Soon, the new techniques for handling knowledge that are developing in research settings will begin to crop up in the marketplace both as new tools for developing expert systems and as enhancements to existing tools.

Alain Rappaport, president of Neuron Data, Inc. in Palo Alto, has already said that techniques such as reasoning by analogy, learning by discovery and choosing among multiple problem-solving paradigms will be incorporated into Nexpert Object, which is Neuron's application development shell.

Neuron Data has also created Nextra, a tool capable of eliciting and designing knowledge. Nextra, with a high level of interactivity and graphical imagery, lets domain experts structure their thoughts about a specific task at a high level of abstraction. This

THE NEW techniques for handling knowledge that are developing in research settings will soon begin to crop up in the marketplace.

type of tool is excellent for highly conceptual, hard-to-formalize tasks, such as market positioning or strategic planning.
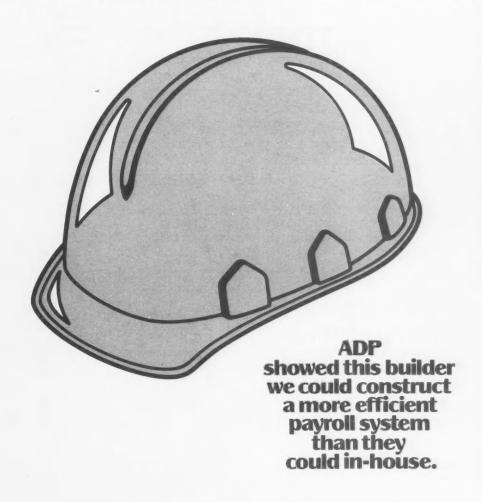
In the long term, Rappaport says he expects Nextra to serve as a personal laboratory in which one can discover common processes of reasoning in real-world applications. Understanding these common processes will yield new techniques of knowledge representation and reasoning that will emerge from real experience.

The commercial success of AI and expert systems has made the discussion of human thought processes relevant to computer marketing. To meet the needs of their developers and users, expert systems will evolve to incorporate new forms of knowledge processing that closely approximate human thought.

Such techniques will affect the ease of both interaction and programming, thereby making personal computing accessible to a broader population. ●

Expert system shells

COMPANY	PRODUCT	HARDWARE PLATFORM	LANGUAGE USED	KNOWLEDGE REPRESENTATION	TYPES OF CONTROL STRUCTURES	INCLUDES CERTAINTY FACTORS	INCLUDES EDITING TOOLS	INCLUDES TRACE AND DEBUG FACILITIES	INCLUDES EXPLANATION FACILITY	EXPLAINS CONCLUSION REACHED	EXPLAINS INFORMATION REQUESTS	SAVES DATA FOR TESTING	SOFTWARE INTERFACES	TYPES OF USER INTERFACE	INCLUDES SEPARATE RUNTIME MODULE	PRICE
Alcorp, Inc. (617) 890-8400	KBMS	IBM 370, 4300, 3000 and compatibles	C	Object-oriented	Inferencing	No	Yes	Yes	Yes	Yes	Yes	Yes	DB2, SQL/DS, VSAM, Adabas, IMS, IDMS, KDB	Menu, graphics, natural language	Yes	$90,000-$225,000
Aion Corp. (415) 328-9595	Aion Development System	Any IBM 370 architecture under VM and MVS, IBM PC, PS/2	Pascal, C, Cobol, assembler	Rules, object-definition structure	Forward and backward chaining, procedural control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	DL/1, DB2, SQL/DS, VSAM, QSAM, Teradata, Dbase III, Rbase 5000	Menu, graphics, text, window	Yes	$7,000-$60,000
	Aion Execution System	Any IBM with 370 architecture under VM and MVS, IBM PC, PS/2	Pascal, C, Cobol, assembler	Rules, object-definition structure	Forward and backward chaining, procedural control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	DL/1, DB2, SQL/DS, VSAM, QSAM, Teradata, Dbase III, Rbase 5000	Menu, graphics, text, window	Yes	$250-$25,000
Arity Corp. (508) 371-1243	Expert	IBM PC, XT, AT and compatibles	Prolog	Frame- and rule-based	Backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	C, Pascal, Fortran, assembler, Dbase III, 1-2-3	Graphics, windows	Yes	$295
Automated Reasoning Corp. (516) 484-6254	I-CAT Troubleshooting System, Automatic Test Development System	Macintosh II, all Unix-based computers running X Windows	C	Rules	Procedural control logic-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any ASCII files	Menu	No	$15,000
Battelle Columbus Division (614) 424-3747	DSPL	Xerox	LISP	Objects, plans, rules	Plan selection, constraint-directed redesign	No	Yes	Yes	Yes	Yes	No	Yes	NP	Graphics, text, tables	No	$9,500
	CSRL	Microvax, Sun, Apollo, Xerox	LISP	Objects, rules	Establish, refine	Yes	Yes	Yes	Yes	Yes	No	Yes	C	Graphics, text, tables	Yes	$4,500
BBN Software Products Corp. (617) 873-5000	RS series Expert System Shell	IBM VM/370, PC XT, AT and compatibles; HP 9000 Series 300, Sun, DEC VAX	C, RPL	Rules, decision tree	Forward chaining, inference engine	No	Yes	Yes	Yes	No	Yes	Yes	Any via custom interfaces	Menu	Yes	NP
Berkshire Software Corp. (516) 583-8019	Turbo Shell	IBM PC, XT, AT and compatibles	Prolog	Rules, frames	Backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	No	1-2-3, Dbase III	Menu	No	$89
California Intelligence (415) 391-4846	Xsys	IBM PC, XT, AT and compatibles; VAX/VMS, any running Unix	LISP, C	Rules, frames	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Symphony, Dbase III, any program with EXE or COM extension	Menu, variable questions, graphics, icons	Yes	$395
Carleton Corp. (617) 272-4310	CQS-AET	IBM 4300 series and up	Cobol	Logical rules	Forward chaining	Yes	Yes	Yes	Yes	Yes	No	Yes	VSAM, BDAM, IMS/DL1, IDMS/R, Datacom/DB, Adabas, Total/Supra, DB2	Menu	Yes	$9,500
Carnegie Group, Inc. (412) 642-6900	Knowledge Craft	Microvax, VAX; Sun-3, Sun-4, TI Explorer	LISP	Frames, logic, rules	Forward, backward chaining	No	Yes	Yes	No	No	No	Yes	C, SQL	Graphics, text	No	NP
	Test Bench	IBM PC, AT and compatibles; TI Explorer	LISP, C	Frames	Forward, backward chaining	No	Yes	Yes	Yes	Yes	Yes	Yes	None	Graphics, text	Yes	NP
Computer Software Management and Information Center (Cosmic) (404) 542-3265	C Language Integrated Production System (CLIPS) V 4.2	IBM PC and compatibles, Macintosh, VAX	C	Symbolic facts	Forward chaining	Yes	Yes	Yes	Yes	No	No	No	C, Fortran, Ada	Window, command line	Yes	$250
Control Data Corp. (800) 553-2215	KES	Cyber mainframes	C	Rules, demons, classes	KES control language	Yes	No	Yes	Yes	Yes	Yes	Yes	C applications	Terminals	Yes	$4,000-$20,000
Coyne Kalajian, Inc. (703) 522-7026	ExpertR	Wang VS	C	Rules	Forward and backward chaining, combined chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Wang WP, WP+, ResponseR, WIIS and any DBMS on the VS	Menu, PF-key-driven, Strategy Language (proprietary)	Yes	$20,000-$40,000
Cullinet Software, Inc. (617) 329-7700	Application Expert	IBM mainframe running MVS, DOS, VM, OS/2, VAX	Expert language (proprietary)	Rules	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	No	MVS/CICS, MVS/IDMS, VM/IDMS, DOS/CICS, DC/UCF, DC/UCF, VAX/VMS	Intelligent dialogue, smart forms	Yes	$3,000-$60,000
Data General Corp. (508) 870-6763	Gold Works	Dasher 286, Dasher 386, Eclipse MV	LISP	Frames, rules, object representation	Forward, backward chaining, demons, sponsors, agendas, pattern matching	Yes	Yes	Yes	Yes	Yes	NP	NP	CEO, Infos II, 1-2-3, Dbase III	Line, menu, why, how, Help	Yes	$1,520-$24,370
Digital Equipment Corp. (800) 344-4285	VAX Decision Expert	VAX family, Vaxstation,	C	If-then rule tables, decision trees, trees	Forward chaining, goal-directed reasoning	No	Yes	Yes	Yes	Yes	Yes	Yes	VAX languages, applications, databases	Menus, Decwindows	Yes	NP
Drasch Computer Software (303) 429-3817	CLisp, CRules	NA — runs with C	C	Rules	Production system	No	No	Yes	No	No	No	No	None	C	No	$268
Dynacomp, Inc. (716) 265-4040	Hansen-Predict	IBM PC, XT, AT and compatibles	C	Rules	NP	No	No	Yes	No	Yes	Yes	No	1-2-3, Symphony	Menu	No	$100
Eawa Corp. (415) 966-6200	Loops	Sun3, Sun4	LISP	Object hierarchies	Forward chaining, active values	No	Yes	Yes	Yes	Yes	No	Yes	Document and graphics editors	Graphics	No	$7,000
Expertelligence, Inc. (805) 967-1797	Experfacts	Macintosh 512, Plus, SE	Experlisp 1.5	Knowledge	Forward, backward chaining, meta rules, asking justification, caching	No	Yes	Yes	Yes	Yes	Yes	No	None	Mac Toolbox	No	$495
	ExperOPS5-Plus	Macintosh 512, Plus, SE	Expercommon LISP	Rules	Forward chaining	No	Yes	Yes	No	Yes	No	No	None	Mac Toolbox	No	$495
	Expercommon OPS5	Macintosh 512, Plus, SE	Expercommon LISP	Rules	Forward chaining	No	Yes	Yes	No	Yes	No	No	None	Mac Toolbox	No	$625
Expert Systems International (215) 735-8510	ESP Advisor	IBM PC, XT, AT and compatibles, VAX	Prolog	Rules	Backward chaining	No	Yes	Yes	Yes	Yes	Yes	Yes	None	Prolog 2	Yes	$895
	ESP Frame-Engine	IBM PC, XT, AT and compatibles	Prolog	Rules, frames	Forward, backward chaining	No	Yes	Yes	Yes	Yes	Yes	Yes	None	Prolog 2	Yes	$895
Exsys, Inc. (505) 256-8356	Exsys	IBM PC, XT, AT, Compaq, VAX/VMS, Unix machines	C	Rules	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any running under host operating system	Menu	Yes	From $395

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

COMPANY	PRODUCT	HARDWARE PLATFORM	LANGUAGE USED	KNOWLEDGE REPRESENTATION	TYPES OF CONTROL STRUCTURES	INCLUDES CERTAINTY FACTORS	INCLUDES EDITING TOOLS	INCLUDES TRACE AND DEBUG FACILITIES	INCLUDES EXPLANATION FACILITY	EXPLAINS CONCLUSION REACHED	EXPLAINS INFORMATION REQUESTS	SAVES DATA FOR TESTING	SOFTWARE INTERFACES	TYPES OF USER INTERFACE	INCLUDES SEPARATE RUNTIME MODULE	PRICE
Exsys, Inc. (505) 256-8356	Expert System Development Package	IBM PC, XT, AT, Compaq, VAX/VMS, Unix machines	C	Rules	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any running under host operating system	Menu	Yes	From $395
1st Class Expert Systems, Inc. (508) 385-7722	1st Class Fusion	IBM PC, XT, AT, PS/2 and compatibles	Pascal, assembler	Examples, rules	Forward and backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1-2-3, Dbase III, any ASCII file	Menu, graphics	Yes	$1,295
General Research Corp. (703) 893-5900	The Intelligent Machine Model (TIMM)	IBM PC XT, AT and compatibles, IBM mainframes, VAX, Prime	Fortran 77	CASE-based in a multidimensional space	Forward, backward chaining	Yes	Yes	Yes	No	Yes	Yes	Yes	User-defined via custom interfaces	User-defined	Yes	$1,900 (PC) $19,000 (mainframe)
Gensym Corp. (617) 547-9606	G2 Real-Time Expert System	DEC, HP, Sun, TI, Symbolics	Common LISP	Rules	Meta controls, inference engine, real-time scheduler with priorities, demons	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Fortran, C,	Structured natural language, direct graphical manipulation, animation	Yes	$18,000-$36,000
Gold Hill Computers, Inc. (617) 621-3300	Goldworks II	IBM PC, AT, Macintosh II, Sun workstations	Allegro Common LISP, Golden Common LISP, Sun Common LISP	Multiple inheritance frame-based lattice	Forward, backward, bidirectional chaining, rules, sponsors, object-oriented programming, rule sets, handlers	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Dbase, 1-2-3, Hypercard, Widow Draw, DDE	Menu, developer's interface, functional LISP environment	Yes	$3,995-$7,500
Human Intellect Systems/Mindsoft (800) 522-5939	Instant-Expert	Macintosh	Modula-2	Rules	Forward, backward chaining, combination	Yes	Yes	Yes	Yes	Yes	Yes	Yes	None	Menu, Q&A	Yes	$49.95
	Instant Expert Plus	Macintosh, IBM PC with 640K	Modula-2	Rules	Forward, backward chaining, depth first search, probability, certainty	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Graphic, Pict and Pict-2	Graphic, Q&A, menu, mouse	Yes	$498
	Nexus	IBM PC with 640K	Modula-2	Rules	Forward, backward chaining, combination, depth first search, probability, certainty	Yes	Yes	Yes	Yes	Yes	Yes	Yes	User-defined with full language included	Mouse, menu	No	$4,800
IBM (617) 576-5301	IBM Knowledgetool	370	PL/I	Object attribute value, arrays, single variables, rules	Forward chaining, pattern matching, conflict resolution, procedural block structure	No	No	Yes	No	No	Yes	Yes	DB2, SPL/DS, DL/1, VSAM, Cobol, PL/I, assembler, Fortran, Pascal, ISPF, GDDM	Menu-driven, windows, commands	Yes	$9,205-$105,880
	Expert System Environment	370, PS/2, PC, XT, AT	Pascal	Single- and multiple-valued parameters, rules focus control blocks, rule-selection strategies	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	DB2, SQL/DS, Files, DL/1 VSAM, Cobol, PL/I, Fortran, assembler, Pascal, Rexx	Menu-driven, commands	Yes	$515-$57,570
	KEE	370	IBM Common LISP	Frames, demons, methods, multiple words, rules, rule classes, rule hierarchies	Forward and backward chaining, pattern matching, agenda, hypothetical reasoning, truth maintenance, object-oriented	No	Yes	Yes	Yes	Yes	Yes	Yes	DB2, Fortran, assembler, other languages via LISP	Menu-, mouse-driven commands, windows	Yes	$98,000
	Enhanced Common LISP Production System	370	IBM Common LISP for MVS	Rules, rule groups, working memory elements, on-change demons, all Common LISP flavors	Forward chaining, pattern-matching, rule sequencing control, MEA, LEX, FIFO queuing	No	No	Yes	No	No	No	No	LISP	ISPF panels, PC windows	No	$5,000
Inference Corp. (213) 417-7997	Automated Reasoning Tool	Apollo DN3000, DN4000, HP 9000, Symbolics, Sun-3, Sun-4, VAX, TI Explorer I, II, Microexplorer	LISP	Rules, facts, relationships schema; integrated forward, backward chaining	Pattern matching, viewpoints	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Custom interfaces for Oracle, Ingres, IMS, CICS	Graphics	Yes	$22,500-$45,000
	Automated Reasoning Tool for Information Management	IBM AT, PS/2 and compatibles, IBM mainframes running MVS	C	Rules, facts, relations schema, pattern matching	Forward chaining, truth maintenace	Yes	Yes	Yes	Yes	Yes	Yes	Yes	ISPF, IMS, VSAM, Dbase	ISPF, MF	Yes	$7,000-$8,000 (PC), $60,000-$70,000 (mainframe)
Information Access Systems, Inc. (303) 443-6234	Intelligent Text Management System	VAX/VMS, CDC 910/Unix	C	Judgment space	NA	Yes	Yes	Yes	Yes	No	No	Yes	NP	User definable	Yes	$5,000-$155,000
Information Builders, Inc. (800) 444-4303	Level 5	IBM PC, XT, AT, PS/2, Macintosh Plus, SE, II, VAX/VMS, IBM mainframe	Pascal, C, assembler	Rules	Goal outlining, procedural rules	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Dbase, Excel, Focus, RS/1, Datatrieve, RDB, CDC	PF-key driven, windowing, mouse, menu	Yes	$685-$36,000
Intellicorp, Inc. (415) 956-5500	Knowledge Engineering Environment (KEE)	Sun workstations, VAX, Vaxstation, IBM mainframe, Apollo, Macintosh II, HP, IBM RT, 80386-based machines	LISP, C	Frames, rules, object-oriented	Forward, backward chaining, mixed initiative, attached procedural, message passing	No	Yes	Yes	Yes	Yes	Yes	Yes	C integration tool kit, common windows	Graphics	Yes	$9,000-$98,000
Intelligenceware, Inc. (213) 417-8896	IXL: The Machine Learning System	IBM PC, AT	C	Discovery rules	Forward, backward chaining	Yes	No	No	Yes	Yes	Yes	Yes	NP	Menus, graphics	Yes	$490
	Intelligence/Compiler	IBM PC, AT; VAX	C	Frames, rules, procedures	Forward, backward, inexact chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NP	Menus, graphics	Yes	$490
	Auto-Intelligence	IBM PC, AT	C	Rules, interviews	Forward, backward, inexact chaining	Yes	Yes	No	Yes	Yes	Yes	Yes	NP	Menus, graphics	Yes	$490
Intelligent Controlsystem Corp. (508) 458-6829	Picon System	Explorer II LX	LISP	Frame-, rule-based	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	No	Yes	Major distributed control systems	Menu	Yes	$120,000 (includes hardware)
Intelligent Environments, Inc. (508) 256-6412	Crystal	IBM PCs and compatibles with 350K of RAM	C	Rules, variables	User-defined	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1-2-3, Symphony, Dbase III, DOS, any ASCII, C	Menus, forms, graphics, multifield forms, flip-flop menus, reports, induction	Yes	$995 (MS-DOS), $1,995 (OS/2)
Jeffrey Perrone & Associates, Inc. (415) 431-9562	Expert Ease	IBM PCs except AT, PS/2	Pascal	Examples	Inductive inference	No	Yes	Yes	Yes	Yes	Optional	Yes	None	Menus, graphics	Yes	$695
	Expert Edge	IBM AT and compatibles	Pascal	Rules	Forward, backward chaining	Yes	Yes	Ltd	Yes	Yes	Yes	Yes	1-2-3, Visicalc, Dbase III, any ASCII	Menu	Yes	$1,495
KDS Corp. (312) 251-2621	KDS3.3	IBM PC, XT, AT, PS/2 and compatibles	Assembler	Rules, frames, facts, objects	Forward, backward chaining, mixed chaining, blackboard	Yes	Yes	Yes	Yes	Yes	Yes	Optional	1-2-3, Dbase III, ASCII files	Text, graphics	Yes	$1,495

COMPANY	PRODUCT	HARDWARE PLATFORM	LANGUAGE USED	KNOWLEDGE REPRESENTATION	TYPES OF CONTROL STRUCTURES	INCLUDES CERTAINTY FACTORS	INCLUDES EDITING TOOLS	INCLUDES TRACE AND DEBUG FACILITIES	INCLUDES EXPLANATION FACILITY	EXPLAINS CONCLUSION REACHED	EXPLAINS INFORMATION REQUESTS	SAVES DATA FOR TESTING	SOFTWARE INTERFACES	TYPES OF USER INTERFACE	INCLUDES SEPARATE RUNTIME MODULE	PRICE
Kemp-Carraway Heart Institute (205) 226-6697	Flops	IBM PC, AT, PS/2 with MS- or PC-DOS	C	Rules	Clipboard, rules, block control	Yes	NP	Yes	No	No	No	No	C, DOS programs	Line interface	No	$495
Lightwave, Inc. (813) 988-5033	Expert System Inference Engine (ESIE)	IBM PCs running MS-DOS	Pascal	If-then rule structure	Backward chaining, inference engine	No	Yes	Yes	Yes	Yes	Yes	Yes	None	Menus, graphics	Yes	$145
Logicware, Inc. (416) 672-0300	Twaice	IBM MVS/TSO, VM/CMS, VAX, all Sun, Silicon Graphics 4D, all Apollo, Integrated Solutions, Tektronix, HP 386, CDC, Cyber	MProlog	Frames, rules	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Fortran, Cobol, C, assembler	NP	Yes	$48,900
	MProlog	IBM MVS/TSO, VM/CMS, VAX, Sun, Apollo, IDT, Tektronix, HP 386, Silicon Graphics 4D, Integrated Solutions, Cyber, CDC	C	Frames, rules	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Fortran, Cobol, C, assembler	NP	Yes	$48,900
Machine Intelligence Corp. (516) 589-1676	Mice	IBM PC, XT, AT and compatibles	C	Semantic net, frames	Forward, backward chaining, confidence factors, flow control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	None	Menu, graphics	Yes	$1,750
MDBS, Inc. (800) 344-5832	Guru	IBM PC XT, AT, PS/2 and compatibles, VAX/VMS, Sun Unix	C	Rules	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Dbase III+, MDBS III, Knowledgeman/2, 1-2-3	Menu, natural language, command language	Yes	$6,500
Miller Microcomputer Services (508) 653-6136	Expert-2 in MMSForth	IBM PC, XT, AT, PS/2, Tandy TRS-80 1, 2, 4	MMSForth	Rule-based	Backward chaining	Optional	Yes	Yes	Yes	Yes	Yes	No	MMSForth editor extension word sets	Menu, graphics, natural language	No	$250-$1,250 (including MMSForth)
Mind Path Technologies (214) 233-9296	Intelliform	IBM PC, XT, AT, PS/2 and compatibles	C	Rules	Forward, backward chaining	Yes	Yes	No	No	Yes	Yes	Yes	ASCII files	Forms, pop-up windows	No	$495
Mountain View Press, Inc. (415) 961-4103	Expert 2	IBM PC, Apple II	Forth	Rules	Backward chaining	No	Yes	No	Yes	Yes	No	Yes	NP	NP	Yes	$150
Mystech Associates, Inc. (203) 572-9571	Aurora	Xerox 1100, IBM PC, VAX	Interlisp, Common LISP, C	Production rule	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	NP	LISP, Common LISP, C	Keyboard, mouse	No	$1,500-$8,000
Neuron Data (415) 321-4488	Nexpert Object	IBM AT, PS/2, Macintosh SE, II, DEC VAX, Vaxstations under VMS and Ultrix, Sun, HP, Apollo workstations, IBM RT under AIX, IBM mainframes under VM	C	Rules, objects	Forward, backward chaining	No	Yes	Yes	Yes	Yes	Yes	Yes	Excel, 1-2-3, Ease-Plus, Hypercard, Oracle, Sybase, Ingres, DEC RDB, Dbase III, Data Views	Graphics	Yes	$3,650-$8,000
Paperback Software International (415) 644-2116	VP-Expert	IBM PC, XT, AT, PS/2 and compatibles	C	Rules	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any DOS-executable file	Text, dynamic graphics, windows, pull-down menus, mouse	No	$249
Prediction Systems, Inc. (201) 223-5000	General Simulation Systems	Microvax	PSI simulation language	Expert system, database	Hierarchical	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NP	Menu, graphics	Yes	$19,000
Production Systems Technologies (412) 683-4000	OPS83	Apollo, AT&T 3B, AT&T 6386, HP 9000/300, Masscomp, Stratus, Sun, VAX, MS-DOS, OS/2	C	Rules	Any	No	No	Yes	No	No	No	No	C	NP	Yes	$2,000-$20,000
Quantum Inknowvations Corp. (408) 496-6933	Pro Genesis	IBM AT, PS/2 Model 50 and higher, 286, 386 compatibles	C	Objects, rules, variables, models	Forward, backward chaining	No	Yes	Yes	No	No	No	Yes	SQL to Oracle, DB2, Informix, C	Windows, forms, speadsheets	Yes	$4,995
Radin Corp. (512) 454-4797	Rulemaster 3	IBM PC, XT, AT, 3000	C	Rules, examples	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any ASCII file, files that can be called from C	Menu, window	Yes	$495
	Rulemaster 2	Cyber 860, 990, 205, VAX, HP 9000, Apollo, Sun workstations, Masscomp, Unisys XE/550	C	Rules, examples	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any ASCII file, files that can be called from C	Menu	Yes	$7,500-$28,000
Smart Communications, Inc. (212) 486-1894	Smart Expert Editor-Smart Translators	IBM PS/2, VAX, Unix workstations	C	Lexical tokens	Rule base linked to databases	Yes	Yes	Yes	Yes	No	Yes	Yes	ANSI C, Unix SVID, VMS VM/CMS	None	Yes	$12,500 (with expert editor package)
Softsync, Inc. (212) 685-2080	Superexpert	IBM PC, XT, AT, Macintosh, Macintosh Plus, SE, II	Pascal, Forth	Examples	Forward, backward chaining	Yes	Yes	No	Yes	Yes	Yes	Yes	Any ASCII file	Menu	No	$199
Software Architecture and Engineering, Inc. (703) 276-7910	Knowledge Engineering System	IBM mainframes, PCs and compatibles, Apollo, HP, Silicon Graphics workstations, VAX under VMS and Unix, Gould Powernodes, any Unisys, CDC Cyber	C	Rules, descriptions, classes	Forward and backward chaining	Yes	No	Yes	Yes	Yes	Yes	Yes	Any file that can be called from C	Menu-driven text queries, graphics optional	Yes	$4,000-$60,000
Sourceview Software International (415) 685-3635	Micro Mind Knowledge Engineering Tool	IBM PCs	IQ LISP	Rules	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1-2-3, Dbase	Menu, graphics	Yes	$9,995
Symbolics, Inc. (617) 621-7500	Joshua	Symbolics 3600	Symbolics Common LISP	Statement-oriented language, object-oriented	Forward, backward chaining	No	Yes	Yes	Yes	Yes	NP	NP	Symbolics Software System	General user interface	No	$15,000-$60,000
Teknowledge, Inc. (415) 424-0500	M.1	IBM PC and compatibles with 512K	C	Rules	Backward chaining, pattern matching	Yes	Yes	Yes	Yes	Yes	Yes	Yes	C files	Menus, application can substitute own interface	No	$2,000
	S.1	VAX, Microvax, NCR Tower, HP 9000-300, Apollo Domain IX, Aegis, Sun-3, IBM AT and compatibles	C	Rules	Backward chaining, attached procedures, explicit procedure calling	Yes	Yes	Yes	Yes	Yes	Yes	Yes	C files	Menus, application can substitute own interface	Yes	$15,000 (PC), $20,000 (mainframe)
	Copernicus	VAX, Microvax, Sun, Apollo/Domain IX, Aegis	C	Rules	Forward, backward chaining, attached procedures, explicit procedure calling	Yes	Yes	Yes	Yes	Yes	Yes	Yes	C files	Menus, application can substitute own interface	No	$30,000
Texas Instruments, Inc. (800) 527-3500	Personal Consultant Easy	IBM XT, AT, PS/2 and compatibles with 512K	Scheme LISP	Frames, rules	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1-2-3, Dbase, any DOS.EXE programs	Menu, graphics	Yes	$495

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North Africa...U.S. paratroopers on the way to their next mission. (Credit: International News Photos)

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COMPANY	PRODUCT	HARDWARE PLATFORM	LANGUAGE USED	KNOWLEDGE REPRESENTATION	TYPES OF CONTROL STRUCTURES	INCLUDES CERTAINTY FACTORS	INCLUDES EDITING TOOLS	INCLUDES TRACE AND DEBUG FACILITIES	INCLUDES EXPLANATION FACILITY	EXPLAINS CONCLUSION REACHED	EXPLAINS INFORMATION REQUESTS	SAVES DATA FOR TESTING	SOFTWARE INTERFACES	TYPES OF USER INTERFACE	INCLUDES SEPARATE RUNTIME MODULE	PRICE
Texas Instruments, Inc. (800) 527-3500	Personal Consultant Plus	IBM 286-, 386-based micros and compatibles	Scheme LISP, C	Frames, rules	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Any DOS program and external language interface, 1-2-3, Dbase	Menu, graphics	Yes	$2,950
	Procedure Consultant	IBM AT, PS/2, TI Professional and Business Pro	PC Scheme, C	Tree structure	Fault tree	No	Yes	No	Yes	Yes	Yes	Yes	1-2-3, Dbase	Q&A, graphics, windows	Yes	$495
Thunderstone/EPI, Inc. (216) 449-6104	Metamorph	Minis, micros	C, assembler	Rules frames	Forward, backward chaining	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unltd	Natural-language protocols	Yes	$5,000 (site license)
Transpower Corp. (215) 495-6352	Expert Thinker	IBM PC XT, AT and compatibles, PS/2	Compile Arity Prolog, Turbo Prolog	Logic	Backward chaining	No	Yes	Yes	Yes	No	Yes	Yes	Any ASCII text file	Menu, graphics	No	$149
Unisys Corp. (313) 972-7000	KES II	IBM AT, Unisys B series workstations, Unix systems	C	Rules, frames	Forward and backward chaining, procedural control	Yes	No	Yes	Yes	Yes	Yes	Yes	C, Pascal	Windows	Yes	$50-$10,000
	KEE	Explorer, Explorer II, U5000/50	LISP	Rules, frames	Forward, backward chaining, active values, methods, truth maintenance system, keywords	No	Yes	Yes	Yes	Yes	Yes	Yes	LISP, C	Windows	No	$30,000

Shower

beleaguered expert systems industry.

Cigna's Schelm strikes an optimistic note. "Expert systems are very definitely beginning to take hold in corporate America," he says.

But skeptics still exist. At Ford, Cnossen and Duemler do not see expert systems taking hold across the country, although they remain intrigued with the future prospects.

"We may have had more bullish expectations a year or two ago about the number of applications to which we could apply expert systems," Cnossen says. "But I think we have learned a lot and have recalibrated our expectations."

Robert Rouse, assistant dean at the School of Technology and Information Management at Washington University in St. Louis, goes a step further. He is the director for the university's Center for the Study of Data Processing, a 45-member consortium of Midwestern corporations that includes Anheuser-Busch, Inc., General American Life Insurance Co., McDonnell Douglas Computer Systems Co., Monsanto Co., Ralston Purina Co. and Southwestern Bell Telephone Co.

Although he is bullish about the future, Rouse says, "Artificial intelligence and expert systems are not yet beginning to catch on in business environments. Most MIS managers are taking a relatively cautious view toward this technology. Part of that is due to the fact that they have seen a long list of 'revolutionary technologies' over the years that have proved to be much less successful than advertised."

One area that could use some bolstering, according to users, is the process of importing human expertise into the knowledge base.

"That is still too much an art form," says Michael Saindon, principal consultant on expert systems applications at St. Louis-based McDonnell Douglas. "There

Andersen's Carter

Ford's Duemler

just isn't a good mechanism yet for mapping concepts espoused by an expert into a rule-based processor. And if you don't map well, the system will give bad advice."

Painted rose

For the long run, users and consultants paint a rosy picture of the integration of expert systems into the corporate data processing environment. Rouse says he believes that the number of expert systems will double every year or so for the next 10 years. "By the year 2000, there will be hundreds of thousands of expert systems being used by companies," he says.

One of the most commonly advanced scenarios is that in five to 10 years, expert systems may not be differentiated from other software because they will be built into all the classic applications.

Moreover, Cnossen notes, "Maybe it will reach a point where just about anyone will be able to use an expert system product, just as they do Lotus' 1-2-3 now." Users also liken the expansion of expert systems to the wave-like advances seen in relational databases and fourth-generation languages.

Until now, many MIS shops may have had little reason to become interested or involved with AI-based products. They could be balanced on the brink of discovery, however.

According to Foundation Technologies' Loofbourrow, "This is the year that the indifference of MIS managers to expert systems will give way." If it doesn't, MIS is going to find other departments pushing ahead without them, he adds. The payback potentials are such that business people are going to take the initiative on their own.

MIS managers who do take the initiative and examine the tools and applications that are available now may find some personal benefits attached to the search, such as AI-enhanced products that can lighten the housekeeping load around the data center. •

ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.

When does Information Builders expect to have Level 5 redesigned and modified so that it will operate directly from a Focus database?

Larry Efird
Director of MIS
Briggs-Weaver, Inc.
Dallas

INFORMATION BUILDERS, INC.: Look for this capability early next year. We are currently working on the creation of an embeddable inference engine, and once that is created, we will put one inside Focus. Level 5 currently has the ability to read and write Focus files on Digital Equipment Corp.'s VAX machines and mainframes.

Does Carnegie Group plan to pursue the use of machine-to-machine interaction with Testbench? If so, when?

Allen Reid
Project Manager of AI
Technical Support
Prime Computer, Inc.
Milford, Mass.

CARNEGIE GROUP, INC.: Testbench supports a callout mechanism that allows a user to start external programs. Through callout, a user can start a process that queries a host machine through a modem and returns the response information to Testbench. Testbench then uses the information to guide the diagnosis.

Carnegie Group currently offers custom extensions to the system that provide more functionality, and we are evaluating the market need for specific kinds of machine interfaces. Based on market needs, the company will implement new functionality in both the interfacing and core diagnostic areas.

Does Aion plan on putting ADS on a

DEC or Sun Microsystems, Inc. platform? If so, when?

Stan Bronson
MIS Director
Systems Industry
Milpitas, Calif.

AION CORP.: Aion is committed to the support of commercial data processing in production environments and is aware that these environments include non-IBM platforms. Today, however, Aion's product is delivered on PC-DOS, OS/2, VM/CMS, MVS/TSO, CICS and IMS/DC — all IBM systems running on IBM hardware.

Our customers tell us that application transportability between these platforms — personal computers and mainframes — is a valuable characteristic. We believe that extending that transportability to include non-IBM platforms, such as DEC's, would increase our value to production data processing.

Aion's long-range plans do include such support. It should be noted that there are also IBM platforms to which our product can be moved, such as the Application System/400.

Does Gold Hill plan on establishing an internal interface from a personal computer to a mainframe for Gold Works?

Ted Kao
Lead Systems Designer
Cigna Corp.
Voorhees, N.J.

GOLD HILL COMPUTERS, INC.: In August, Gold Hill announced Golden Connection/SQL, a tool that integrates applications written in Gold Works with SQL. For PC users desiring connectivity to IBM mainframes, this product will be compatible with DB2 relational databases and several IBM PC networking services, including 3270 data streams and Netbios. As the DB manager services become available, Golden Connection/SQL will support them.

Look out behind

When the symptoms of software engineering troubles get more attention than the problems do

BY ASHER YUVAL

What are the real problems in producing and maintaining software? Does MIS sometimes confuse essential problems with symptomatic ones? Can you put aside these symptoms — most probably the consequences of real problems — identify the actual problems and simply and coherently enumerate them?

If not, then in acquiring a computer-aided software engineering (CASE) tool, a methodology or any other software engineering technique, you may unknowingly be applying the right solution to the wrong need.

A symptom is a "problem" about which you may ask, "Yes, but why is it so? What causes it to occur?" A real problem, on the other hand, is one about which there is no further why to ask.

For example, software engineering problems have been described as goals not yet reached by Doug Bell, Ian Morrey and John Pugh in their book, *Software Engineering: A Programming Approach.* But those are probably symptoms rather than real problems, since you can simply ask, "Why haven't these goals been achieved?"

MIS' initial efforts in software engineering, therefore, should be to differentiate clearly between these two brands of difficulties. Then, after being identified and isolated, the real problems should be further divided into two subgroups:

● **Environmental problems,** which are especially relevant to information systems. These are real problems, insofar as our ability to change the environ-

Yuval is president and founder of Methoda Computers Ltd., an independent consulting firm based in Jerusalem.

CHRIS DEMAREST

ment is limited and, hence, asking why is practically useless.

● **Fundamental problems,** which, like natural laws, stem from the very nature of the software medium.

Ultimately, software engineering challenges can be properly broken down into symptoms, fundamental problems and environmental problems. All are identifiable. But whether or not identifying a problem is half a solution is left for you to decide.

Symptoms

Once the symptoms are identified, then MIS can get to the real problems. Consider, for example, the following, which are more likely symptoms of larger challenges:

● **Software cost and schedule estimation.** After careful examination, you may discover that this problem isn't different from the more general problem of project management.

There are three classical approaches to project management

in any engineering field: managing a project by its activities, by its intermediate products or by both. On the basis of the approach taken, schedule and budget estimates can be made. Project management is feasible only when either the activities or the intermediate products are fairly well known. If this is not the case, then even the most sophisticated project management system — using the latest PERT/CPM and Gantt techniques, an eight-color plotter and a dedicated 386 personal computer — simply won't help.

Consider, too, whether the activities or the products in software engineering projects are clearly defined before making a cost estimate. What methodology is being used to derive the activities and products? When and how is feedback from previous projects accumulated?

Cost and schedule estimates of software projects are never accurate unless the discipline that underlies the projects is

clearly defined. The fact that project management isn't always a great success in other engineering fields should be a warning and not a comfort for software engineering.

In short, software cost and schedule estimates are not real problems; they undoubtedly result from a more fundamental problem — namely, the lack of a clearly defined software engineering discipline.

● **Lack of experienced professionals.** Asking, "Why is there a lack of experienced professionals?" is quite natural in this case, and if the answer is "Because of a lack of experienced instructors," you may then ask, "Yes, but why aren't there experienced instructors?"

The answer might be "Instructors are underpaid," which is probably not true; or "Top professionals don't like to teach," which is probably not true; or "It's a young industry," which it isn't anymore.

Perhaps part of this problem

• **Getting back to basics**

• *Do* **sweat the details**

• **Right solution, wrong problem?**

is that the profession is not defined well enough. Can MIS precisely describe its different occupations and specify their requirements? Are there clear and meaningful titles for these occupations? Can a DP project manager who wants to staff a team point to the various craftsmen required, their exact titles and when and for what tasks they are required? Is the title "DP project manager" itself clearly defined?

While the situation differs from one MIS organization to another, on the whole, the issue remains serious. Since software engineering is a discipline is not defined, its different professions are not defined, either. And since the professions are not defined, how can they be properly taught and learned?

• **Software maintenance.** This symptomatic challenge can be divided into two categories: the disturbing distribution of the

Be aware, however, that the lack of professionals is not an essential reason for the poor state of software engineering. Other problems prevent it from becoming a well-defined engineering discipline, thus making it difficult to teach and study.

cost between development (30%) and maintenance (70%); and the overall cost of maintenance in terms of money, morale and other factors.

Again, neither of these are real problems. First, as has been noted in Capers Jones' book, *Programming Productivity*, when maintenance is carefully analyzed and correctly split between defect repair and en-

hancement, the picture radically changes and the true figures become development (50%), defect repair (14%) and enhancement (36%).

Second, the high cost of maintenance, as most engineers will probably agree, is actually the result of incorrect design. Thus the question in this case is, "What is the cause of bad design?" Is it due to the failure to allocate enough resources for analysis and design?

Many MIS managers — backed by heavy experience and plentiful literature — deny this possibility, claiming that 50% of the development effort already goes into analysis and design with no major impact on maintenance.

Or perhaps bad design is the consequence of the rigid life-cycle model, which is unsuitable for dynamic, changing environments.

Whatever the reasons, software maintenance difficulties are the result of more basic prob-

I**NSTEAD of dwelling on symptoms, MIS should address at least some of the problems facing its software engineering professionals today.**

lems in the software engineering discipline.

In a similar way, many other classical problems in software engineering — such as software reliability, software portability, performance, budget and schedule overruns and so on — are all symptoms of more essential problems.

So instead of dwelling on symptoms, MIS should address at least some of the real problems facing its software engineering professionals today.

Environmental problems
A handful of well-known problems are actually environmental problems, especially those related to information systems in which there exists a close interaction between the computerized system and the organization's strategic and intrinsic operations.

These problems can be characterized in terms of the interaction with the enterprise's functions and the interaction with other disciplines.

The DP field as a whole, and software engineering in particular, suffer from trying to fulfill expectations beyond their scope and capacity. In part, this is an artificial problem that stems from overselling DP as a solution to all of an organization's illnesses. At the same time, managing data in any organization is essential; it is almost like managing the organization itself. Thus, it is

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no wonder that building and implementing an information system requires talent, knowledge and power far beyond what software engineering alone has to offer.

MIS must make a major decision in this regard: Should it extend the software engineering discipline to cover topics outside its "natural" domain, or should it seek the cooperation of other disciplines (and if so, which ones?) and be ready to pay for such collaboration?

Another environmental problem deserves serious consideration, although it has received little attention. It can be called the transparency problem. "Transparency" in this case means the correspondence of the information system to the real world.

A software system with a high degree of transparency is one that truly reflects reality, whereas a system with a low degree of transparency is one that runs parallel to the real world without corresponding to it. Modern banking systems are good examples of high-transparency systems; one may even say that the real world — namely, the actual money — is in the system itself.

On the other hand, project management systems are examples of low-transparency systems — which may explain much of their operational difficulties.

MIS should try to categorize the following systems in terms of degrees of transparency: inventory, finance, reservation systems, command and control and electronic mail.

But why is the transparency issue important, and where exactly does the problem lie? In software engineering, the *type* of system we deal with is crucially important — as pointed out in *Programming Productivity* — and that is a fact MIS often disregards in the rush to build. Systems with low transparency are easy to build and maintain but may, in fact, be useless. Systems with high transparency may be difficult to build, and they are certainly difficult to enhance and modify, but they have high pros-

THE GAP between software engineering and other engineering disciplines is so wide that MIS should exercise caution before borrowing any idea from these disciplines.

pects for success.

How to identify and measure a system's transparency and how to raise the system from a low to a high degree of transparency are major environmental problems in software engineering.

Fundamental problems

The most fundamental problems in software engineering include the lack of physical properties, the flexibility-to-rigidity shift, the transformation issue and the informal-to-formal shift.

• **The lack of physical properties,** or more correctly the lack of natural objective properties, is well described in E. R. Fairely's *Software Engineering Concepts.* Although somewhat hard to grasp when first posed, it is so fundamental that it probably forms the basis of many other problems.

Its main implication is that the gap between software engineering and other engineering disciplines is so wide that MIS should exercise caution before borrowing any idea from these disciplines.

Engineering disciplines throughout history have progressed as a result of the close interaction between natural science and practical engineering. At the very center of this fruitful interaction lies a shared body of knowledge to which many people have contributed and that has seldom been seriously challenged. And when someone does ... well, such a person could only be an Einstein or a Newton.

Instead of physical properties, substituted soft(ware) properties emerge, such as structured programming rules, data normalization forms and so on. If this is the right trend, then software engineering is indeed a unique discipline, the first of its kind in history, in which human

consensus — not nature — determines engineering properties.

• **The flexibility-to-rigidity shift.** Software is the most flexible engineering medium today. That's what makes it so easy to prototype. No wonder other engineering disciplines use software systems to simulate their systems. But somewhere along the development process the software medium becomes rigid and hard to modify. When exactly does this happen? What causes it to happen? Is it a matter of the system's order of magnitude? If so, in what terms is magnitude to be measured?

Our inability to explain the flexibility-to-rigidity shift in software engineering, let alone measure it, is certainly a fundamental problem.

• **The transformation issue.** As a software system is being developed, it undergoes several transformations before finally becoming operational. It is first put into text format — the initiation stage; then data flow diagrams and data store diagrams are drawn up — the analysis stage; then structured charts and entity relationship diagrams are sketched — the design stage; then code is produced.

At the end of each stage the entire knowledge of the system must be transformed to a new medium.

Quite often this mapping is done verbally, passing from one professional mind — the analyst's — to another — the designer's. You can only pray that no information is spilt while being poured from one vessel to another. This problem has been intensified by all the structured methodologies that add more and more stages to the system's life cycle.

Still, it is a fundamental problem, since even the shortest path entails at least three transformations: from the user's mind to the professional's mind, from the professional's mind to a computer's symbolic language and from the operational system back to the user's mind.

One transformation, however, has been accomplished with remarkable precision ever since computers were invented: namely, good old compilers. There is probably much to gain by extending their power and introducing them earlier in the system's life cycle.

• **The informal-to-formal shift.** Another problem similar to both the transformation and the flexibility/rigidity problems is the informal-to-formal shift.

Informal, natural language is still the best vehicle for communicating. Without it no project ever gets off the ground. Most users prefer natural prose to technically sophisticated data flow diagrams.

But somewhere during a software engineering project, things must be formally defined or else

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ONE TRANSFORMATION has been accomplished with remarkable precision ever since computers were invented: namely, good old compilers.

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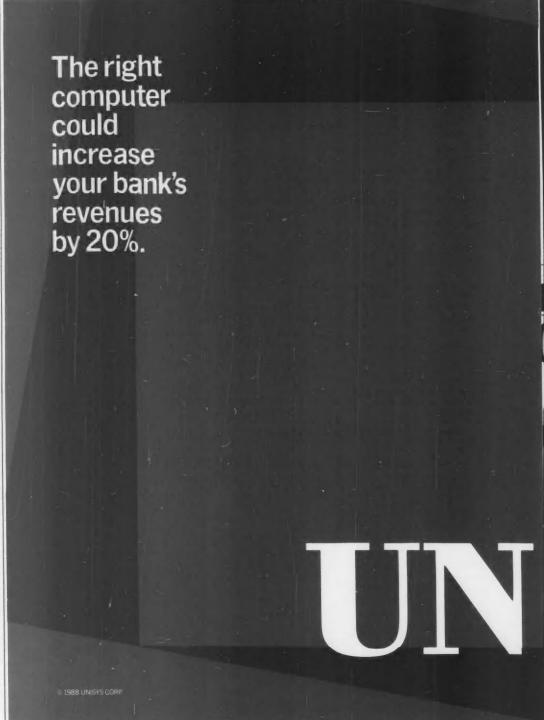
they cannot be implemented in a machine. MIS must consider where the shift from the informal to the formal should be introduced and what impact this should have on the user's involvement in the project.

An interesting subset of this problem applies to non-English-speaking countries. The informal native language used at the beginning of the project is later converted to formal software engineering tools in English-like formats. A data entity, for instance, is first defined in a local language using analysis-stage tools or simply a text processor.

This is essential in order to communicate with the user. Later on, that same data entity must be redefined and put into a database data dictionary in order to communicate with the application generator.

Unclassified problems

In addition to the fundamental and environmental problems in software engineering, there are

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several others that are more difficult to classify:

• **The "small" details problem.** Anyone who has ever analyzed a software system knows about those "small" nasty details that, if not defined to the very last bit, endanger the entire grand design. This is a severe problem not merely for top-down approaches but also for any implementation of ordered procedures, such as life-cycle models. This problem is unclassified because it could be considered a symptom or a real, fundamental problem in terms of the informal-to-formal shift.

• **The user involvement problem.** User involvement is certainly crucial for a project's success. This may be regarded as a real environmental problem if only because it is difficult to identify the user throughout the entire life cycle. At the same time, it may be the result either of other environmental problems such as the interaction with the enterprise's functions or the fundamental transformation and informal-to-formal problems.

• **The lack of a computer science.** This problem is quite often cited as *the* problem in software engineering, and since it is an "academic" problem, it apparently is fundamental. But surely one may still ask: "Why isn't a science being built around software?" A possible answer may be that software lacks physical properties.

• **Psychological problems.** Various problems, such as professional egoism and reluctance to change, may be considered fundamental by some. But these problems may well be the *result* of the flexibility-to-rigidity shift or the lack of objective software properties.

Philosophizing

Classifying software engineering problems may sometimes seem somewhat philosophical, but why not philosophize from time to time in our attrition-conscious profession? Furthermore, the classification of problems gives a yardstick by which to evaluate the different software engineering tools and methodologies.

The cost of implementing these solutions is very high and far exceeds their purchase cost. Also, as noted in 1986 by R. Goldberg in the *IBM Systems Journal*, technology transfer —

WHY ISN'T a science being built around software? A possible answer may be that software lacks physical properties.

particularly in software engineering — is very slow, and the implementation of new ideas can take years. Knowing in advance which problems a software engineering solution intends to solve is, therefore, extremely important.

For instance, a proposed software engineering solution that promises to reduce maintenance through CASE tools should comprise the following:

• Clearly defined and easily measured software characteristics.

• Flexible database and module definitions enabling changes as late as possible in the life cycle.

• A minimum number of stages in the life cycle and a straightforward transformation from one stage to another.

The differentiation between real problems and symptoms in software engineering does not necessarily mean that solutions should be applied only to real problems. As in medicine, remedies are often successfully applied directly to symptoms. Yet, also as in medicine, concentrating only on symptoms without trying to identify the real causes is certainly poor practice.

The decision to treat symptoms or real problems is perhaps also a function of time considerations. Applying solutions to symptoms can sometimes work quite well in the short run — for example, solving an immediate problem for a specific project.

But for companies where the production of software is an indispensable part of the business, and certainly for the software industry as a whole, the only effective and long-range solutions lie in attacking the real problems, not the symptoms. •

MANAGEMENT

SISP: Easier to say than do

Strategic information systems planning (SISP) heads the long list of systems executives' concerns. Our recent study of 80 companies and their SISP experiences let us offer some insights and guidelines to avoiding obstacles.

SISP denotes the creation of a long-range plan of business applications for a firm to computerize. It includes pinpointing new systems to help carry out the firm's current business strategy and conceiving clever ideas for systems to help it create a new strategy to outdo competitors.

Increasingly, companies are carrying out SISP studies. They are following complex, proprietary methodologies (IBM's Business Systems Planning) or customizing their own approaches. They are building teams of in-house systems managers and business managers, often including outside consultants, to help perform the studies.

These organizations spend lots of time and money on their SISP studies. However, the studies do not necessarily go smoothly. MIS executives often complete them with disillusionment and disappointment.

In order to learn about SISP, we used a list of 49 potential problems to ask MIS planners within 80 companies that recently completed a SISP study. Following are the 10 most severe problems along with our

Year of renewal for the DPMA

The group scrambles to regain revenue, membership and recognition

BY JEAN S. BOZMAN
CW STAFF

PARK RIDGE, Ill. — After 36 years, the Data Processing Management Association (DPMA) took a long, hard look at itself in the mirror and did not like everything it saw.

A 1987 survey of 36,000 members showed membership declining and a $2 million budget that supported the 20-person staff at DPMA headquarters but could not buy full-time Washington, D.C., lobbyists.

Many DPMA members also faced their employers' ambivalence about out-of-town travel for DPMA functions. "The perceived value of DPMA member-

Christian G. Meyer

ship wasn't apparent to some employers," said Perry Baty, secretary of the DPMA's Southwestern states region. "So DPMA has decided it has to clean up its house and to polish the perceptions about DPMA."

"We've called 1988 the 'Year of Renewal,'" said Christian G. Meyer, president of the DPMA, whose one-year term runs out in January. "For the past two years, we've been suffering a revenue loss that was due, in part, to the end of the National Computer Conference (NCC). As one of the four co-owners of NCC, we used to get $400,000 to $500,000 a year."

As the DPMA was analyzing its membership survey, it was thinking of ways to replace the revenue lost when the once-booming NCC deteriorated, Meyer said. "The loss [of the NCC money] forced us to look at our situation a lot harder and quicker than we would have had that financial cushion been in place," Meyer said. The DPMA budget for 1989 is projected at $2.5 million, slightly higher than the 1988 budget, he said.

Money-making ideas have surfaced, though not yet implemented, Meyer said. Among them are establishing a for-profit subsidiary, creation of new management training and technical seminars and an expanded membership drive.

Inside

- SIM honors Lithonia Lighting, Frito-Lay with leadership award. Page 108.
- Study uncovers key to smooth moves. Page 110.
- DPMA hot on the trail of legislative news. Page 109.

Klitten exercises leadership at Chevron

BY KATHY CHIN LEONG
CW STAFF

The physical and emotional test of the Vietnam War taught Martin Klitten many things. One of the things he learned while serving as a first lieutenant in the U.S. Army was the art of managing and leading a fighting force of people from all walks of life.

"Believe it or not, there are a lot of similarities between this job and my two-year role in Vietnam," explains Klitten, president of Chevron Information Technology Corp. (CITC), a San Ramon, Calif.-based wholly owned subsidiary of Chevron Corp. "You learn how to develop a sense of intuition in various situations and to develop people skills that you never thought you had," he adds.

Klitten has had plenty of time to exercise his leadership skills. He arrived at Chevron in 1970 as a financial analyst and was elected to the position of comptroller for Chevron U.S.A. in 1985. He was promoted to his current position last November.

Those people skills are coming in very handy as the MIS subsidiary serving the needs of Chevron undergoes a major reorganization that will not see completion until the end of the year.

This March, all 2,000 employees were informed about the restructuring that involved closing one and downsizing another of the company's four data centers. More than 50% of the work force will be affected by rede-

ployment or change of job responsibilities.

According to the plan, the Houston and San Ramon data processing sites will stay open while the MIS facility in the Southern California town of La

PROFILE
Martin Klitten

Position: *President, Chevron Information Technology Corp.* **Mission:** *To use people skills in carrying out Chevron's MIS reorganization and consolidation.*

Creative execs cop SIM prize

Lithonia Lighting, Frito-Lay system builders lauded for work

BY JAMES CONNOLLY
CW STAFF

MINNEAPOLIS — The creators of a customer information system that helped to increase one firm's revenue sixfold in seven years and a hand-held computer-based sales system credited with saving another company more than $20 million annually will be honored today as winners of the Society for Information Management's (SIM) Partners in Leadership Award.

SIM identified the winners as President Jim H. McClung and Senior Vice-President Charles J. Darnell of Lithonia Lighting in Conyers, Ga., as well as Plano, Texas-based Frito-Lay, Inc. Vice-President of Sales Operations Ronald A. Rittenmeyer and Vice-President of Management Services Charles S. Feld. The awards, which will be presented at the annual SIM meeting here, are intended to honor executives from the IS community and the user community who work in partnership to produce major results for their businesses.

Outlining the results of his firm's Lithonia Light Link and ACE+ systems, Dar-

nell said, "The most important benefit is that it ties our information systems strategy in with our business strategy. The most important benefit from that, in turn, is that it ties us closer to our customer."

Competitive edge

Lithonia, a lighting equipment manufacturer and subsidiary of National Service Industries, reportedly has boosted its sales from $96 million to $559 million since it began using its first generation of Light Link systems on an IBM Series/1 minicomputer in 1980. Now based on personal computers, Light Link and ACE+ have helped the company maintain a competitive edge by making it easier for customers to do business and thus maintaining their loyalty, Darnell said.

According to Lithonia, order processing has been reduced by one week to half of the industry average, with the company filling orders in a week regardless of customer location. Other effects of the system include: reduction of errors in order specification and product design through knowledge-based technology; identification of new product opportunities by automatically capturing customer inquiry information; extra revenue of $3 million annually by selling spin-off information technology; conversion of a weekly invoice preparation process into a daily process; and generation of profits for Lithonia's customers.

The systems were designed to support the internal business needs of Lithonia's branch locations and agents, including accounting and personnel applications, as well as handling tasks such as on-line transmission of specifications, quotations, prices, orders, acknowledgments, order status and inventory status.

McClung was nominated for his com-

Lithonia's Darnell

mitment to Light Link and his early work in soliciting company agents' viewpoints and needs. Darnell was nominated for his work as the catalyst for the systems and his recognition of the valuable role PCs could play in the corporation.

Frito-Lay's Rittenmeyer and Feld were nominated for their work in developing the snack-food company's hand-held computer strategy, which placed these portable machines in the hands of 10,000 route sales representatives.

Those computers are carried into retail food stores where Frito-Lay sales personnel enter information about the store's inventory and make their deliveries. The hand-held computer is attached to a printer in the delivery truck to produce an invoice, and it downloads its information via modem daily into minicomputers located in more than 200 distribution centers.

According to Frito-Lay, the system reduces paperwork and errors and improves order tracking in the inventory and ordering process, allows Frito-Lay to instantly download new product information and prices into the system rather than relying on order forms printed monthly and gives each sales representative an extra three to five hours per week to seek out new accounts or foster relationships with existing customers.

The company also said the system allows Frito-Lay headquarters to calculate daily sales by category, channel and geographic region within 24 to 36 hours rather than in one week; monitor sales successes and market trends within 48 hours rather than in two or three weeks, thus enabling manufacturing to immediately adjust production; evaluate promotions while they are ongoing; and save more than $20 million annually.

DPMA
FROM PAGE 107

Creating a higher profile image for DPMA will be a key element in DPMA's outreach to hundreds of thousands of potential members nationwide. That is why the association is experimenting with videotaped messages and redesigned publications to reach a larger slice of the DP management pie.

"It's a continual battle we fight," Meyer said. "But we're trying to broaden our marketplace by reaching out to the user community. We're seeing many end users, like architects and financial analysts, who are managing information resources for the first time. That kind of person needs the kind of support, expertise and networking that DPMA can provide."

Saw it coming
Even before the survey was taken, DPMA knew it had a problem because its ranks were steadily thinning.

"For the last 26 months, there has been a spiraling downward in membership in DPMA, a steady decline," said Donald G. Oberg , director of membership and publications.

Yet the decline in membership was seen as part of a broader, national problem. "All associations are experiencing a declining or stabilizing membership," Oberg said. "If a corporation is feeling an economic pinch, it may put certain things on a hit list, like attending out-of-town association meetings. Instead of four people, they might send just one person."

The DPMA survey, launched in 1986 as the first in a series of such evaluations, showed that the problem went deeper. It pointed to the modest self-image of DPMA, which sits behind a car dealership in a suburb just west of Chicago. DPMA could have been making more noise, its staunchest supporters agree.

"We haven't done a good job of letting the world know who we

are," said Terry Felker, a former Army information systems officer who is DPMA's national secretary and treasurer.

"We're becoming very aggressive to make the association stronger," added Wall Street Chapter President Richard Lefkon, who has been a member since 1985 and is also a Citibank NA vice-president. "I would have joined DPMA earlier if I had known about them."

One place the DPMA is looking for new members is among the ranks of upper DP management. While an estimated 70% of DPMA members work in operations or DP management, many are based in small- to medium-sized shops.

To reach top IS professionals in large organizations and to give outsiders a taste of DPMA, the association scrapped its *Data*
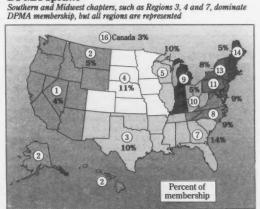
John A. Venator

Management magazine in favor of a flashy quarterly publication, *Information Executive.*

To help turn things around, DPMA also consulted with its senior advisory council of top MIS executives last year. Among those on the board are the following: Max Hopper, senior vice-president of information systems at American Airlines; Irwin J. Sitkin, vice-president of corporate administration at Aetna Insurance Co; and Fred Meier, vice-president of corporate program management at Unisys Corp.

"They are our sounding

board," said John A. Venator, DPMA's executive director and daily operations administrator, "We ask them what they think about the issues and ask them to help us plan for the future." The 16 members of the council are available for advice, even though schedules may keep them from DPMA functions.

The big payoff
As the DPMA's 37th annual convention is set to unfold in Dallas from Oct. 31 to Nov. 2, the association's corrective actions seem to be paying off. By August, membership's downward spiraling had stopped, Oberg said, and September membership figures were expected to show an increase. The convention will probably draw approximately 1,000 attendees.

To spark user interest, DPMA management is pushing the concept of special interest groups (SIG). "The networking aspects of DPMA meetings tends to break down a little bit when you don't have common interests," Oberg observed. SIGs also give rank-and-file members leadership roles, something that was not previously available without election as a regional or chapter official.

There are six SIG groups, including ones in artificial intelligence, office systems and telecommunications. SIGs can be formed by any DPMA member, provided he can attract 50 participants nationwide. As a grass-roots expression of changing interests, SIGs are seen in DPMA as a way to stay relevant. "As long as you have an association that's pliable, that's responsive, you're OK," Oberg said.

Before SIGs, the path to DPMA recognition was to climb the ladder of DPMA chapters and regional posts. There are 13 DPMA chapters in the U.S. and one in Canada, and each has a full set of officers.

Beyond that, each chapter appoints an association director to sit on the board of 280 directors at the DPMA's annual meeting. This group sits with the DPMA's management board at the annual DPMA convention, giving each chapter a direct view of the association's most important meeting.

From Phoenix to Dallas to New York's Wall Street, 280 chapters meet monthly to discuss DP matters over dinner and coffee. "You sit down to dinner with friends," said the Wall Street Chapter's Lefkon. "You can speak your mind, express your concerns, and you get advice and support in return with no negative repercussions."

The freedom from worry about mistakes makes the discussion flow more freely at chapter meetings, said Michael Rosario Isabella, association director at the Phoenix DPMA chapter.

"At DPMA, you can throw

Tracking legislation

Believing in computer security is one thing. Trying to get government to do something about it is another.
This is why the DPMA monitors legislative activities in Washington, D.C., and in state capitals nationwide. When a proposed law affects the data processing community, the DPMA uses its "Legislative Network Briefs" newsletter to alert DPMA members. If a law is needed, DPMA members are encouraged to make proposals to their legislators in person.

This is what happened after the federal government passed a computer crime bill in 1986. Just after the federal act was passed, DPMA drafted a model law that could be used as the basis for similar state legislation.

"We had a state legislator from Minnesota call us, asking about computer crime bills," said Joseph E. Collins, who leads the DPMA governmental affairs office. "I think he ended up introducing our model bill verbatim."

The bill passed the Minnesota Senate, Collins recalled, but it did not pass in the legislature.

The DPMA maintained an office in Washington in the 1970s, Collins said, but that was abandoned by the early 1980s. "We go out there to meet some of our members, and we go along with them as they meet with their congressmen," he said. "But our focus really has changed over the state level in recent years."

Grass-roots approach
By taking this grass-roots approach, the DPMA forgoes having a Washington lobbyist on retainer.

At DPMA headquarters, Collins keeps up with legislative news across the U.S. by logging on to an electronic database. Primary topics of interest include laws affecting VDTs, computer crime and security and computer education. Abstracts of pending bills are published in the "Legislative Network Briefs" quarterly.

"We'll research any legislation related to computers," Collins offered, adding that DPMA volunteers are always ready to stuff envelopes for a computer-related cause.

If a state's legislative committee needs an expert witness, Collins searches a list of DPMA members in that state.

"We feel testimony has more of an impact when it's coming from someone who's actually a constituent in that state."

JEAN S. BOZMAN

out any idea, no matter how off-the-wall it is," Isabella said. "You can run it by 50 people before you ever mention it to your boss. That way, you can find an answer to a question before it even becomes a problem on the job."

> "AS LONG AS YOU HAVE an association that's pliable, that's responsive, you're OK."
>
> DONALD G. OBERG
> DPMA

The recent changes in DPMA direction are already bearing fruit at chapter meetings around the country. "At one time, the big guys said that DPMA is made up of people from a lot of small shops, and they backed off," Isabella said.

"But that was before my time," Isabella added, who joined the DPMA in 1982 as a college student. "Now, a lot of the bigger shops including IBM are coming back into our chap-

ter, joining other large shops like American Express which never went away."

Meyer said his career blossomed after he joined DPMA in 1970. "At that time, I was a senior programmer about to become a supervisor," he recalled.

"Initially, I was looking for the education about management that DPMA provided, but later on, the networking part of DPMA membership kicked in." Today, Meyer is vice-president of BST Consultants, Inc. in Tampa, Fla.

But making contacts in DP, at home or at an annual meeting remains the most popular reason for joining DPMA. "Being a part of the DPMA has been great for me," said Baty, who joined in 1981. "I've learned a lot. I've met a lot of people."

Baty, who was president of his chapter last year and elected regional secretary this year, has his eyes on a national DPMA office. "I'm still climbing the ladder."

DPMA sprawl
Southern and Midwest chapters, such as Regions 3, 4 and 7, dominate DPMA membership, but all regions are represented

(16) Canada 3%

10%

5%

5%

8%

13

5%

11%

9%

5%

10%

9%

9%

10%

14%

Percent of membership

Klitten

Habra will will be pared down to support research. The Concord, Calif., facility will later serve as a remote networking site for a credit card application.

By December, the company is expected to have lost 100 employees due to attrition and a voluntary early retirement plan for operations personnel.

But that is not all. The reorganization means a consolidation of two other data processing sites. According to Klitten, the MIS operations from the Chevron Geosciences Co. and the Chevron Oil Field Research Co. are being merged under his corporate MIS entity.

Klitten is still responsible for the strategic and tactical implementation of the plan expected to carry Chevron through at least the next five years. One goal is for the MIS organization to spend the same amount of money as before but to spend it better. The company, which has $350 million in fixed assets, has an operating budget of $240 million for 1988. It will spend some $75 million on new purchases.

"We had too much duplication of effort

"**I** DON''T think people should underestimate the detailed planning necessary to instill confidence in people and the company."

MARTIN KLITTEN
CHEVRON

before the reorganization," Klitten says. "The goal of this project is to consolidate and not have competing forces within the organization. We want to save money, but more important, we want to operate in the future as an efficient utility."

Since the MIS company serves everyone within Chevron, Klitten says, he wants to make sure that data processing and networking services are competitive with the services sold elsewhere. The charter of the MIS organization is not to seek a profit but to maintain an equal balance sheet between costs and revenue. In July, the company was able to refund $15 million to Chevron's various departments and to reduce rates on services.

The reorganization sought to ensure that similar refunds will be the norm. The streamlining should also shave $8 million in costs annually.

Technical aspects of the reorganization include moving at least four IBM hosts and other machines to the San Ramon and Houston facilities. Yet the overriding issue is not what to do with the technology but how to handle a transition that affects more than 50% of the staff.

Immediately after the announcement, Klitten and his team of managers staged 12 group meetings with employees throughout the organization. Klitten explained the reasons for the consolidation and fielded questions from the staff.

"If you take away uncertainty, you can alleviate the morale problem," he says.

Constant communication with employ-

Early planning key to smooth mergers

BY JAMES CONNOLLY
CW STAFF

MINNEAPOLIS — Early involvement by MIS executives in the planning process can be one of the keys to managing a smooth transition after a corporate merger or acquisition, particularly when MIS strategies are coordinated with those of the human resources group, according to a recent study by Control Data Corp. and the American Management Association (AMA).

The survey of 109 companies that had endured mergers or acquisitions showed that a slight majority experienced no significant problems and that 63% felt they had adequate information for decision making during the merger process. However, less than half of the companies had a complete picture of their computer resources at the time of their mergers. This indicated that while they had adequate information about MIS, the companies wanted more data, according to Patrick M. Delaney, president of CDC's Business Management Services Division.

Delaney said one area in which systems fell short of providing needed information during a transition was in helping to keep key employees from becoming victims of the turnover that naturally follows a merger. He said communications can overcome such a problem.

Delaney urged senior managers to call on the MIS and human resources groups early in the merger process. He said that major mistakes reported by some of the participants included the failure to draw on the systems to acquire detailed information about employee qualifications or the impact of decisions on the work force; and arbitrary decisions made to eliminate redundant employees and business processes.

"MIS just wasn't called upon, and if it was called in, it often was too late," Delaney said. "A merger or acquisition doesn't have to be traumatic and chaotic,

ees during the transition is critical, he says. "I don't think people should underestimate the detailed planning necessary to instill confidence in people and the company."

An employee newsletter focusing on recent moves is in the development stages. An electronic mail system has an open file called Team, designed for employees to contribute solutions and identify problems within the company. The ideas go directly to Klitten for resolution.

Keep morale up

After years in management, Klitten knows that morale has a direct affect on productivity and work quality. One of the keys to blunting a morale problem is to "do what you told them you are going to do. Following through is critical."

CITC has worked to be open with its clients during the transition. The key now is to make sure the quality of the services does not deteriorate. Technically, no downtime should be experienced as appli-

cations migrate to the two data centers during the weekends. The goal at Chevron is to maintain 99.2% availability at the host, he said.

To ensure that service does not drop, Klitten says, he has made sure that the most knowledgeable people are stationed at the helm of key projects. "Most people have been through the major war here — the Gulf merger."

In March 1984, Chevron merged with Gulf Oil Co. in a $13.3 billion transaction, which represented the largest merger in history. The merger essentially doubled Chevron's oil and gas reserves and led up to a major reorganization in the MIS departments of the two companies.

After this, Klitten says, "We know what does and doesn't work."

with a loss of business or loss in worker productivity. You have to ask yourselves, 'What information do we need, and how are we going to communicate with the employees of both the acquirer and the acquiree about what they need and have to offer?' "

Delaney, who heads CDC's service bureau operation, said supporting such a transition on a consulting basis is one potential new field for service departments seeking to recoup revenue that is lost as their traditional batch-oriented business continues to slip.

Not just money

Delaney maintained that too many companies base their decisions about keeping employees purely on financial considerations. He suggested that firms use their computers and one-on-one interviews to identify individual employees' talents.

Similar close looks can help identify which business processes — those of the acquiree or the acquired — will be used in the merged company, he added.

Delaney also noted that compatibility of hardware and software systems can provide a challenge during the transition. He said that in some cases, executives of the acquiring company did not even know what type of systems the target company was using at the time of the merger. The survey showed that 68.8% of the companies merged systems within a year, although Delaney noted that more than 30% could not complete such a technical merger.

The greatest problems with incompatibility arose in the area of general ledger systems, according to 31.2% of the respondents. Problems with accounts payable and receivable were cited by 27.5%, and problems with production and distribution by 17.8%.

The merging of financial systems was given the highest priority by 40.4% of the companies, followed by operational systems at 31.2%.

CDC initiated the research, which was carried out by the AMA. Chief executive officers and acquisitions officers at 109 companies were surveyed by mailed questionnaires and personal interviews.

The surveyed companies, which ranged in size from several hundred to several thousand employees, generally were one or two years into the merger transition.

Here's how

In a recent interview, Martin Klitten, president of Chevron Information, offered the following advice:

■ Develop your plan thoroughly, both the strategic and tactical elements.

■ Tell your plan to employees as soon as possible. They need assurance that they have jobs for the future.

■ Keep communication with staffers open and continuous. Deflated morale can severely hamper services.
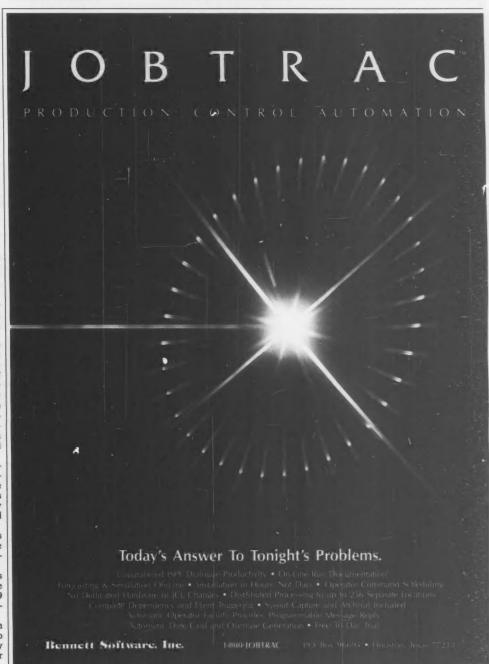
■ Communicate with the user community. Your users need to keep abreast of any changes that might affect the services you provide them.

● Craft your migration plan with plenty of backup alternatives so that end users continue to have the quality services they have been used to receiving.

■ Keep top management up to date on major moves and changes. Stress the benefits and cost savings to offset any skepticism you may encounter.

■ After the reorganization, establish a time to review what has happened to determine if the goals you targeted have been acheived.

KATHY CHIN LEONG

Lederer, Sethi

interpretations and guidelines for prospective SISP planners:

1. It is difficult to secure top management commitment for implementing the plan.

After completing the SISP study, MIS executives face an uphill battle convincing top management to authorize development of the applications that have been identified. The lack of top management commitment to implementation of the plan suggests that it fails to understand its objectives or that it lacks confidence in the MIS department's ability to carry the plan. Also, during the time between the study and implementation, management's interests can change.

This suggests that prospective SISP planners should be sure they know top management's desires before expending effort on a plan that may be ignored. Likewise, it suggests that MIS planners and managers may want to increase their efforts to convince senior management that SISP plans are doable and consistent with management's goals.

2. Implementing the projects and the data architecture identified in the plan requires further substantial analysis.

Many SISP studies do not provide the analysis necessary to start designing and programming the individual applications. Hence, planners should choose an SISP approach that carries them into the design and programming phases. Some vendors offer such methodologies.

3. The success of the methodology is greatly dependent on the team leader.

The team leader must champion the SISP study by convincing top management to support it. SISP planners should choose a respected veteran in the organization's business. The leader should not be from the MIS department but should be one who is comfortable with modern technology.

Furthermore, planners should decrease their dependency on this leader through visible top management support and through a methodology that is defined to simplify the team leader's job.

4. It is difficult to find a team leader who meets the criteria specified by the methodology.

SISP planners may have to search hard to find a business-wise and technology-savvy leader. They should consider all possible candidates.

5. The methodology lacks sufficient computer support.

SISP produces such a volume of reports, tables, charts and diagrams that the information can't be managed manually. Thus, prospective SISP planners who acquire a proprietary methodology should carefully check out the vendor's computer support. Those who expect to develop their own methodology must not underestimate the need for such support. In fact, the expense of developing the support in-house might be enough to sway them to buy a proprietary methodology.

6. The planning exercise takes a long time.

Most studies take weeks, or even months. Because business managers often feel that they need results sooner and may lose interest if they don't get them, planners should minimize the duration of the study.

7. The methodology fails to take into account issues related to plan implementation.

Although the SISP study may produce an excellent plan, it may offer little to promote implementation. Thus, SISP planners should face the issues that can impede implementation of their plans.

8. It is difficult to convince top management to approve the methodology.

Because the SISP study requires considerable time and effort, and because many top business executives are uncomfortable with computing, it is difficult to convince them to fund the initial SISP study. Hence, SISP planners should provide cogent reasons for doing the study and should be ready to present them to top management in simple terms.

9. The strategic information systems plan fails to include an overall personnel and training plan for the MIS department.

SISP studies often recommend hiring more MIS professionals and providing more database and data communications training for existing professionals. SISP planners must allocate the time and resources necessary for these critical personnel and training needs.
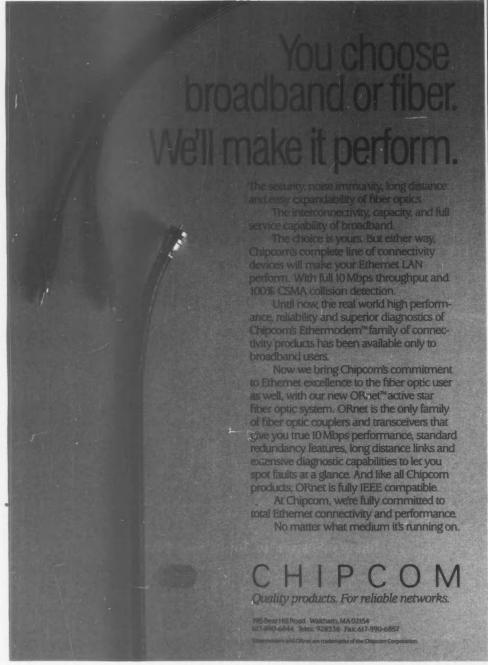
10. It is difficult to find team members who meet the criteria specified by the methodology.

Team members from the user side need to be at ease with information technology, and team members from the MIS side need to understand the business. Such people with the time to participate may be scarce. Prospective SISP planners should consider the qualifications of their team members carefully.

As information technology becomes increasingly important, more firms will carry out SISP studies. For those firms, doing the studies properly and successfully will be critical.

Hopefully, the obstacles we found and actions we prescribe will make their tasks easier.

Lederer and Sethi are business professors at the Joseph M. Katz Graduate School of Business at the University of Pittsburgh and the School of Management of the State University of New York at Buffalo, respectively.

C A L E N D A R

Project/2 Utility Users Group Conference. Hyannis, Mass., Oct. 23-26 — Contact: Project Software & Development, 20 University Road, Cambridge, Mass. 02138.

UFO-Cobol/XE Users Group Annual Meeting. New Orleans, Oct. 23-26 — Contact: Lisa Jones, Users Group Manager, On-Line Software, Fort Lee Executive Park, 2 Executive Drive, Fort Lee, N.J. 07024.

Common, Fall '88 Conference. Toronto, Oct. 23-27 — Contact: Common Headquarters, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Electronic Messaging '88. Boston, Oct. 24-25 — Contact: Electronic Mail Association, Suite 300, 1919 Pennsylvania Ave. N.W., Washington, D.C. 20006.

Network Users Group AT&T. Washington, D.C., Oct. 24-25 — Contact: Bob Jones, Bechtel Power Co., Mail Stop 1E3, 15740 Shady Grove Road, Gaithersburg, Md., 20877.

Expert Systems Symposium. New York, Oct. 24-26 — Contact: Digital Consulting, 6 Windsor St., Andover, Mass. 01830.

Profiting From Strategic Information Management. New York, Oct. 24-26 — Contact: Institute for International Research, 331 Madison Ave., New York, N.Y. 10017.

Conference on Software Maintenance. Phoenix, Oct. 24-27 — Contact: Robert S. Arnold, CSM-88 General Chair, Software Productivity Consortium, 1880 Campus Commons Drive N., Reston, Va. 22091.

Microbanker Expo '88. New Orleans, Oct. 24-27 — Contact: Microbanker, P.O. Box 1508, York, Pa. 17405.

Annual Meeting of the Human Factors Society. Anaheim, Calif., Oct. 24-28 — Contact: Human Factors Society, P.O. Box 16502, Irvine, Calif. 92713.

Federal Computer Conference and Defense and Government Computer-Graphics Conference. Washington, D.C., Oct. 24-28 — Contact: National Council for Education on Information Strategies, P.O. Box 41045, 7315 Wisconsin Ave., Bethesda, Md. 20814.

Stanford Resources Flat Information Display Conference and Exhibition. Santa Clara, Calif., Oct. 25-26 — Contact: Murray Disman, International Planning Information, 465 Convention Way No.1, Redwood City, Calif. 94063.

Seybold Executive Forum. Cambridge, Mass., Oct. 25-27 — Contact: Seybold Executive Forum, Patricia Seybold's Office Computing Group, Suite 612, 148 State St., Boston, Mass. 02109.

Tradeshow & Conference. Boston, Oct. 25-27 — Contact: Laser Active, P.O. Box 2401, Satellite Beach, Fla. 32937.

Educom '88, Campaign for Excellence: Education, Government, Industry. Washington, D.C., Oct. 25-28 — Contact: Educom '88, P.O. Box 364, 777 Alexander Road, Princeton, N.J. 08540.

Systec 88, International Trade Fair for Computer-Integrated Manufacturing. Munich, West Germany, October 25-28 — Contact: VDI Society for Development, Design and Marketing, Postfach 11 39, 4000 Dusseldorf 1, Federal Republic of Germany.

DB2/SQL Seminar. New York, October 26 — Contact: DB2 & SQL/DS Users Bulletin, P.O. Box 560 New York, N.Y. 10005.

Tape Storage Forum. Sunnyvale, Calif., October 26-27 — Contact: Technology Forums, Suite 260, 80 West 78th St., Chanhassen, Minn. 55317.

Datek Print Quality Seminar. Boston, Oct. 26-28 — Contact: Datek Information Services, P.O. Box 68, Newtonville, Mass. 02160.

Federal Conference on Computer Support For Handicapped Individuals. Washington, D.C., Oct. 27-28 — Contact: National Council for Education on Information Strategies, Suite 901W, P.O. Box 41045, 7315 Wisconsin Ave., Bethesda, Md. 20814.

Conference of the International Databus Users Group. Dallas, Oct. 27-28 — Contact: International Databus Users Group, Suite 1100, 3232 McKinney, Dallas, Texas 75204-9990.

Computer Conference and Exposition. New Orleans, Oct. 30-Nov. 2 — Contact: National-American Wholesale Grocers Association, 201 Park Washington Court, Falls Church, Va. 22046.

Information Industry Association, Annual Convention and Exhibition. Washington, D.C., Oct. 30-Nov. 2 — Contact: Information Industry Association, Suite 800, 555 New Jersey Ave., Washington, D.C. 20001.

Intelec 88, International Telecommunications Energy Conference. San Diego, Oct. 30-Nov. 2 — Contact: R. E. Jurewicz, Ground System Consultants, 7008 N. Odell Ave., Chicago, Ill. 60631.

International Conference on Computer Communication. Tel Aviv, Oct. 30-Nov. 4 — Contact: Channy

Greenberg, Kenes USA, Suite 903, 271 Madison Ave., New York, N.Y. 10016.

Seminar On Decision Support and Executive Information Systems. Cambridge, Mass., Oct. 31-Nov. 1 — Contact: Decision Support Technology, Conference Registration Office, 51 Church St., Boston, Mass. 02116.

Practical Neural Network Applications in Signal and Image Processing. Burlingame, Calif., Oct. 30-Nov. 1. Contact: Ben Passarelli, Alliant Computer Systems Corp., One Monarch Drive, Littleton, Mass. 01460.

Systems Integration Business Strategies. Washington, D.C., Oct. 31-Nov. 1 — Contact: International Data Corp., 5 Speen St., Framingham, Mass. 01701.

Data Processing Management Association Computer Conference and Business Exposition. Dallas, Oct. 31-Nov. 2 — Contact: DPMA Dallas '88, Data Processing Management Association Headquarters, 505 Busse Highway, Park Ridge, Ill. 60068.

Unix Expo. New York, Oct. 31-Nov. 2 — Contact: National Expositions Co., 15 W. 39th St., New York, N.Y. 10018.
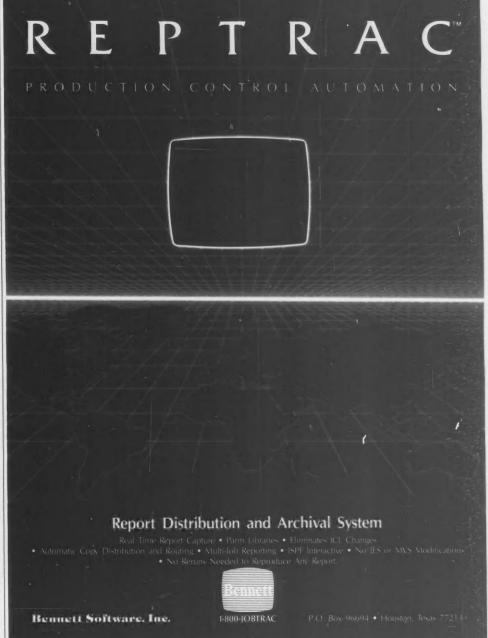
Open Systems Interconnection Conference. Orlando, Fla., Oct. 31-Nov. 2 — Contact: Omnicom, 115 Park St. S.E., Vienna, Va. 22180.

DeBoever Conference on Managing DEC-IBM Integration. Los Angeles, Nov. 1-2 — Contact: Center for Technology Concepts, 3 Independence Way, Princeton, N.J.
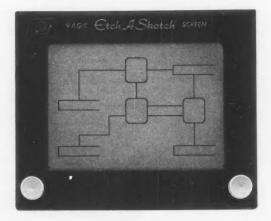
Localnet/88. Boston, Nov. 1-4 — Contact: Conference Management Corp., Box 4990, 200 Connecticut Ave., Norwalk, Conn. 06856.

CASE User Conference. Monterey, Calif., Nov. 2-4 — Contact: Greg Boone, Case Research Corp., Suite 210, 155 108th Ave. N.E., Bellevue, Wash. 98004.

Computer Law Institute. New York, Nov. 3-5 — Contact: Practicing Law Institute, 810 Seventh Ave., New York N.Y. 10019.

COMPUTER INDUSTRY

Japan telco swipes gold

Nippon Telegraph and Telephone Co. (NTT) has achieved the title *ichi ban* (Japanese for No. 1) largest company in the world by the market value of its shares — total number of shares multiplied by the value per share. Second was IBM and third, Japan's Sumitomo Bank.

AT&T commanded an impressive 21st place in the overall ranking and third — behind IBM — in terms of high-tech companies. Viewed as a kind of financial olympics, NTT has won the coveted gold medal, IBM, silver and AT&T, bronze.

Morgan Stanley Capital International Perspective calculated this ranking of the world's 100 largest publicly traded companies as of June 30 by dollar value of all their shares using the exchange rates applicable at the time.

To put things in a computer/communications world perspective, if ranked by the total value of shares, NTT is more than 3½ times the size of IBM ($276.8 billion vs. $76.0 billion) and almost 10 times that of AT&T (with a mere $28.9 billion).

That NTT became the world's most valuable company

Olivetti steering for U-turn

BY AMIEL KORNEL
IDG NEWS SERVICE

IVERA, Italy — Ing. C. Olivetti & Co. late last month outlined a sweeping reorganization and shake-up of top management aimed at reversing the company's recent profit slide.

The computer and office equipment vendor, headquartered here, announced a 24% drop in pretax profits to $122.4 million for the first half of 1988. Last year, the company posted a 29% decline in profits compared with 1986. Revenue during the first half of this year rose 16.1% to $2.59 billion.

Company officials, nonetheless, expressed optimism about financial performance during the second half of the year, saying sales would grow as clients began buying recently released

Olivetti's Cassoni

computer products.

The restructuring bears the signature of managing director Vittorio Cassoni, the Olivetti executive who was recalled in late April from his position as president of AT&T's Data Systems Division by Chairman Carlo de Benedetti. Cassoni left Olivetti

to join AT&T in 1986 with the understanding that he might eventually return to the firm.

Under the restructuring plan, which will take effect Jan. 1, 1989, Olivetti will set up three separate companies dedicated to specific product areas. Each will be responsible for all operations in its area — from product design to production and sales. All three will be controlled and coordinated by de Benedetti and Cassoni.

The first, called Olivetti Systems and Networks, will regroup most of the firm's professional computer and communications activities, including minicomputers, personal computers, local-area networks, terminals, workstations, telecommunications systems, mainframes and related software. It will be headed by

Yocam bids farewell to Apple

BY JULIE PITTA
CW STAFF

CUPERTINO, Calif. — Longtime Apple Computer, Inc. executive Delbert Yocam will walk away from the company in November 1989 after a decade's tenure, company officials said last week.

Yocam was unavailable for comment, but an Apple spokesman emphasized that his departure is "a completely personal decision."
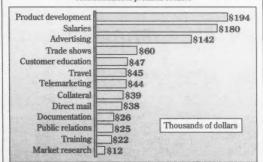
"Del is 45 years old; November will be his 10-year anniversary," the spokesman said. "He

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Data View

Money where your mouth is

Average 1988 marketing budgets for hardware, software and communications products vendors

	Thousands of dollars
Product development	$194
Salaries	$180
Advertising	$142
Trade shows	$60
Customer education	$47
Travel	$45
Telemarketing	$44
Collateral	$39
Direct mail	$38
Documentation	$26
Public relations	$25
Training	$22
Market research	$12

SOURCE: FOCUS RESEARCH SYSTEMS, INC.
CW CHART

A fresh face in Prime spot

BY NELL MARGOLIS
CW STAFF

NATICK, Mass. — Hot off a five-year stint in which, according to industry analysts, he reversed the foundering fortunes of General Electric Co.'s GE Information Services division, Anthony L. Craig can be called a turnaround artist. Early this month, as the surprise news spread of Craig's imminent ascendency to the chief executive's office at Prime Computer, Inc., many called him just that.

Craig, however, indicated that the better label would be "ready for prime-time player."

While he describes himself as

change-management-oriented and "suspicious of excessive static," Craig said that he arrived at Prime with great excitement but no specific game plan. "My immediate role," he said, "is to listen."

The 43-year-old Craig —

Inside

- Sun shines on Cypress Semiconductor. Page 117.
- DCA plans purchase of T1/T3 link developer. Page 117.
- Banyan bares two-year plan. Page 118.

Industry weighs environmental costs

BY J. A. SAVAGE
CW STAFF

Predicating long-term business success on comprehensive environmental controls, representatives from most of the largest computer companies and semiconductor manufacturers made an effort to understand the costs and benefits of being a good neighbor at the computer industry's first environmental conference, held early this month.

Silicon Valley was chosen to host this meeting, since the semiconductor industry there has long been targeted by regulators and environmentalists as the focal point of the computer industry's environmental prob-

lems. "Regulatory bodies target Silicon Valley. What happens here eventually trickles down to us," said Ray Rice, a Unisys Corp. chemical engineer in San Diego.

"Environmental issues are going to decide how competitive you are in the long run. It's a business detriment to have a narrow vision," said Stephen Greene, environmental affairs manager for Digital Equipment Corp. Greene said DEC made a decision in the early 1970s to use a water- and detergent-based cleaning system for its circuit boards, instead of the industry-standard — and inherently toxic — solvents.

Passing the cost on to con-

sumers was not a problem for DEC at the time, because the firm was growing rapidly and disposal costs for the dirty dishwater-type solution were low.

Bit of a pickle

Computer companies that face both federal and local laws requiring further treatment and reduction of toxic wastes are in more of a bind. In seeking to remain competitive, they cannot raise their prices to cover environmental costs.

Computer companies are not only facing replacement of solvents used to clean circuitry but are large users of chlorofluorocarbons, or CFCs, which are thought to deplete the Earth's

ozone layer.
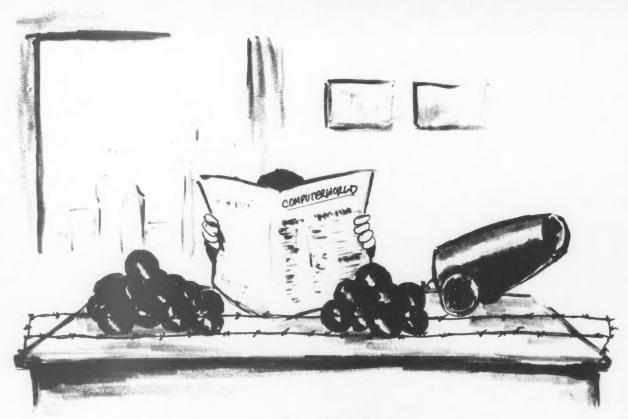
The director of environmental and occupational health for the American Electronics Association, Cheryl Russell, warned against taking short-term solutions to environmental problems. She said the federal government will only get more restrictive in chemical use. Environmentally sound decisions are not just a reaction to regulation, but "a sound business thing to do," Russell said.

DEC has created a task force to find ways to replace CFCs. Greene said that so far, the company has reduced its use by 50% simply by limiting waste and being careful about covering the holding tanks to keep the chemical from vaporizing.

While most industry representatives appeared to acquiesce

to environmental regulation, the holdouts still wanted more business involvement and lobbying and, thus, looser regulations.

California Assemblywoman Delaine Eastin (D-Southern Alameda County) warned that if computer companies pushed too hard for lax regulations, it would result in environmental backlash. "Zero-tolerance laws can result from [public law] initiatives when the perception of the public is that materials are not being managed well," she said.

She also signaled that industry, whether or not it passes the cost on to consumers, will bear the brunt of the cost of regulation. California, like most other states, has strict spending limits, and there is no money available from taxpayers for hazardous waste cleanup.

Cypress profit defies the industry odds

BY NELL MARGOLIS
CW STAFF

SAN JOSE, Calif. — Newly public Cypress Semiconductor Corp. last week announced strong profits and revenue growth, illustrating the relative health of the memory chip niche in the computer industry.

Fueled by the personal computer market's discovery of the benefits of cache memory, which uses the static random-access memory chips Cypress provides, the chip and microprocessor manufacturer last week reported $36.9 million in revenue for the third quarter ended Sept. 26 — a 76.6% increase over third-quarter revenue for fiscal 1987.

Net income for the company came in at $5.5 million, a 71.9% rise from earnings in last year's comparable period as well as a 17% increase over second-quarter profits of $4.7 million.

What trends?

Cypress' upbeat numbers, as well as the expectation that the climb will continue, are bucking several industry trends, according to analysts. The PC market, so recently a seemingly limitless boomtown, has slowed. And earlier this month, the traditionally optimistic Semiconductor Industry Association forecast a 3% industrywide decline by 1990.

The market, however, is ripe for Cypress, said Millard Phelps, an analyst at Hambrecht & Quist, Inc. in San Francisco.

"High-performance static RAM chips are in great demand, because high-end personal computers are using them to feed cache memory," Phelps said.

Waking up to cache

Cache memory, he explained, was, until recently, largely ignored by the PC universe. The superspeed performance that high-end processors such as Intel Corp.'s 80386 make possible, however, has sensitized manufacturers to the need for quick-acting cache memory — a need that worked to Cypress' benefit in its third quarter and is expected to continue propelling the company forward.

"They're at about 2½ times [semiconductor] industry growth right now and growing," Phelps said. "They really do execute well."

During the last quarter, Cypress and its subsidiaries introduced 10 products. The venture-backed company, which has just recently gone public, also took home the Stanford Business School Alumni Association's Encore award as the entrepreneurial company of the year, following in the footsteps of Apple Computer, Inc. and Sun Microsystems, Inc., among others.

DCA makes pitch for T3 firm

BY PATRICIA KEEFE
CW STAFF

ALPHARETTA, Ga. — Digital Communications Associates, Inc. (DCA) recently signed a letter of intent to pay approximately $14 million in cash and DCA common stock for Digital Transmission Systems, Inc. (DTS), a developer of the T1/T3 link.

The purchase will enable DCA to attack the public network market sector.

If the buyout agreement is approved, DTS will become a wholly-owned subsidiary of DCA. The deal is expected to close within 90 days.

DCA already has an entry in the T1 market, the System 9000, which was developed by Cohesive Networks Corp. DCA purchased Cohesive Networks in the fall of 1986. The System 9000, which consists of wide-area voice, data and video networking products, is sold to large corporations building private networks.

DTS products target the telephone companies and long-distance carriers. The company has a cross-connect product under development that is aimed at public networks and will link T1 and T3 systems, according to a DCA spokesman.

If the merger is successful, DTS will become part of DCA's Network Communications Group and the T1/T3 link will be sold by both DTS and the System 9000 sales forces, but to different audiences, he added.

Initial joint development efforts will involve incorporation of the DTS network management system into DCA's Open Network Management System, providing central control of both product lines, said DCA Chairman Bertil Nordin.

Separately, DCA cited seasonal sale slowdowns in several product lines as a reason for an earnings decline to $7.1 million for its first quarter ended Sept. 30 — a 21% decline from the same period a year ago.
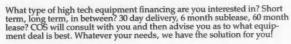
First-quarter revenue totaled $51.7 million, up 3% from revenue of $50.2 million in last year's comparable quarter.

A slowdown in sales of DCA's personal computer-related products typically occurs in the summer. But the firm said that in fiscal 1987 and 1988, the summer slump was negated because customers postponed purchases to evaluate new PC product entries from IBM.

Banyan spills two-year plan

After silence, firm emphasizes Unix, multivendor support

BY PATRICIA KEEFE
CW STAFF

BOSTON — Breaking months of silence on its long-term strategic directions, Banyan Systems, Inc. recently detailed a two-year plan of action that underscores both its commitment to Unix-based servers and a willingness to support other environments.

Chief Executive Officer and company founder David Mahoney said he expects the privately held firm to attain an annualized revenue run rate of more than $100 million next year. A two-year, 12-point initiative focused on large corporate networks will drive Banyan to the half-billion dollar mark within the next three to five years, he added.

Banyan has been hinting at a public offering for several years now and is considered by many industry analysts to be a prime candidate for acquisition.

Loyal to Vines

The Westboro, Mass.-based network software vendor said it has no intention of abandoning its Unix-based Virtual Networking Software (Vines) network operating system and also reiterated support at a briefing in Boston for the role of minicomputers as local-area network servers.

Banyan has already executed an agreement with minicomputer maker Wang Laboratories, Inc. under which it will supply core networking technology. Other such pacts will follow in the near future, the vendor said. One rumored arrangement involves a yet-to-be released Data General Corp. server.

Yocam

wanted to have time to do other things."

Most recently, Yocam was president of Apple Education and Apple Pacific, two operating divisions created during a recent reorganization. He began at Apple as vice-president of manufacturing in 1979 and ascended to chief operating officer, a post he held until the summer.

Some industry observers saw Yocam's move from COO to president of the education and Pacific Rim marketing groups as a demotion. However, Yocam insisted that he was pleased with his new assignment because it allowed him to pursue his passion for education.

In a prepared statement, Apple Chairman and Chief Executive Officer John Sculley lauded Yocam's achievements, calling him "one of the industry's finest executives, with his commitment to operations excellence, passion for personal computer technology and embodiment of Apple's business and cultural values."

Apple Education — created as a separate operating division nearly two months ago — has been folded into Apple USA under President Allan Z. Loren as part of the latest restructuring of the company. In addition, Loren has created the Apple USA marketing group, which will include education and business. David Hancock, previously vice-president of Apple Pacific, will head that group under the title senior vice-president of marketing.

Some analysts are skeptical about the Wang deal, suggesting Banyan has little to gain by it. However, the networking concern's growth plans have been hobbled by its relatively small size and, consequentially, support and marketing limitations.

Successful alliances with larger systems vendors could help expand Banyan's installed base and beef up its support capabilities, a key prerequisite to attracting corporate accounts. These alliances could become especially critical in the next few years, given the following trends:

• Leading players in the work-group LAN arena are moving upmarket to challenge mini-based terminal clusters.

• Concurrently, minis — typically Unix-based — are gaining a new lease on life via conversions to network servers.

• Users are demanding multivendor and multitechnology support.

In response, Banyan promised to integrate and link multiple-protocol and hardware platform support under the Unix-based Vines server.

Banyan's Mahoney

It is still unclear whether Banyan will license Microsoft Corp.'s OS/2 LAN Manager, but OS/2 support is slated for next year and reportedly will include support for applications written to LAN Manager. Rivals 3Com Corp. and Novell, Inc. will ship OS/2 client support this year.

Banyan currently supports Apple Computer, Inc.'s Macintosh via a marketing arrangement with Tops , a division of Sun Microsystems, Inc. However, more direct Mac support will be available in 1989. Also planned is increased support for Unix workstations.

By 1990, users can expect further enhancement of Banyan's distributed systems software support, directory services, global naming service and internetworking links.

> ## "I said, 'What if I cou computers in your compan really inexpensively.'
> ## He was so intrigued I was embarrassed to tell him how simple it was."
>
> —Allen Rehert, AT&T Director of Data Networking

MERGERS & ACQUISITIONS

Electronic Data Systems Corp. announced that it has acquired **General Data Systems, Inc.** (GDS), a privately held Philadelphia-based company specializing in systems and services for the property and casualty insurance industry. GDS' products provide an advanced technological platform for three insurance applications.

Los Angeles-based **Coast Savings and Loan** announced it has completed the $35 million sale of **Data Line Service Co.**, its wholly owned data processing business. The purchaser is **Data Line Holdings, Inc.**, formerly Denver Group Holdings, Inc. Other terms of the sale were not disclosed. Data Line Service is a 22-year-old company with headquarters in Covina, Calif. It provides data processing services to approximately 115 financial institutions having combined assets of $50 billion throughout California, Arizona and Nevada.

Sungard Data Systems, Inc. and **Disaster Control, Inc.** (DCI) announced an agreement in principle for Sungard to acquire DCI. The planned transaction is scheduled to be completed by Nov. 30.

DCI is the largest disaster recovery company for users of Unisys Corp.'s Burroughs mainframe computers. Formed in 1979, DCI provides hot- and cold-site backup facilities and disaster recovery consulting to customers throughout the U.S. DCI is based in Warminster, Pa.

Case Communications, Inc., a subsidiary of UK company **Case Group**, has merged with **Datatel, Inc.**

Both companies had been acquired by the British company **Dowty Group PLC** — Datatel in October 1987 and Case last month. The combined operations will be based in two locations, Cherry Hill, N.J., and Columbia, Md.

Decision Industries Corp. announced that it has completed its refinancing and merger with **Momentum Technologies, Inc.** The businesses of Decision Industries and Momentum Technologies have been combined and will operate under the new name of **Decision Data, Inc.** (DDI).

DDI remains a wholly owned subsidiary of Onset Corp., which is privately held primarily by the venture capital firms of J. H. Whitney & Co. and Welsh, Carson, Anderson & Stowe.

Computer Task Group, Inc. (CTG) has acquired **Applied Management Systems, Inc.** (AMS), a professional services company founded in 1970 and headquartered in Charlotte, N.C. CTG, a $200 million international consulting, systems integration and professional services firm with offices in each of those cities, expects to substantially increase sales in the Carolinas as a result of this expansion.

The AMS offices will combine with CTG's North and South Carolina offices. The expanded Carolina district will employ 700 professional software engineers under James VanGelder, CTG's Southeast District director.

Policy Management Systems Corp. (PMSC) and **Hooper Holmes, Inc.** announced that an agreement in principle has been reached whereby PMSC will purchase certain assets and operations of the Business Information Services Division of Hooper Holmes for a purchase price of approximately $5 million.

The agreement pertains to information services primarily for the property and casualty insurance markets and does not include information services that Hooper Holmes provides to the life and health insurance market and to the direct-mail marketing industry.

Greystone Technology Corp. has been acquired by **National Computer Systems Co.** (NCS) in Minneapolis. Greystone's primary product is GTM, a high-performance Digital Equipment Corp. VAX/VMS-compatible implementation of the ANSI-standard MUMPS programming language and data management system. Greystone will operate as a wholly owned subsidiary of NCS.

The Orange County, Calif., office of **Touche Ross & Co.** — the Big Eight accounting and consulting firm — and Irvine, Calif.-based **Dykstra Consultants**, an information systems management consulting firm, announced that their firms have merged. Dykstra Consultants has moved its offices to Touche Ross' headquarters.

IN BRIEF

Going public

San Jose, Calif.-based **Arix Corp.** (formerly Arete Systems Corp.), purveyor of multiuser Unix-based multiprocessor systems, early this month announced its initial public offering of 2.4 million shares at $7.50 a share. A week earlier, **Landmark Graphics Corp.** announced an initial public offering of two million at $8.00 a share. The Houston-based company is a pioneer in the computer-aided exploration (CAEX) hardware and software niche that helps geoscientists analyze the data needed to target and produce oil reservoirs.

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Going overseas

Newton, Mass.-based graphics supercomputer maker **Stellar Computer, Inc.** opened a wholly owned subsidiary in Tokyo early this month; **Stellar Computer K.K.** joins sister organizations in the UK and West Germany. Stellar also announced that **Makota Yamada,** veteran of a decade at **Digital Equipment Corp.** in Japan, has signed on as general manager of the new Stellar subsidiary. Meanwhile, Massachusetts neighbor **Stratus Computer, Inc.** last week announced the imminent opening of a manufacturing facility in Dublin. According to a Stratus spokesman, the company expects to ramp up production of its XA2000 line of fault-tolerant on-line transaction processing hardware systems on Irish soil by 1989.

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Going for the stars

A multimillion-dollar order signed earlier this month makes **IBM** the on-line transaction processing systems supplier for **Galileo,** a consortium of 10 European airlines including Aer Lingus, Alitalia Airlines and British Airways. The contract — one of the largest garnered by IBM's European operations to date — covers workstations and will place 15 IBM processors in the Swindon, UK-based Galileo Data Centre. The Galileo contract is similar to a deal struck by IBM last year with a four-airline European consortium called **Amadeus.**

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Going for the gold

Sacramento, Calif.-based application development software maker **Unify Corp.**'s coffers swelled by $6.5 million this month, courtesy of a consortium of new and already existing venture capitalist investors. Unify CEO David Saykally declared the new round of venture financing a salute to the company's Accell fourth-generation application development language, sales of which have set Unify revenue and profits on a steadily upward course in the past 12 months.

Olivetti

CONTINUED FROM PAGE 115

Luigi Mercurio, a former Olivetti executive who founded U.S. telecommunications equipment maker David Systems, Inc. The second company, Olivetti Information Services, will offer software, value-added network services, voice/data services, facilities management, education and training and electronic publishing. It will be headed by Olivetti's Franco de Benedetti.

Olivetti Office, the third company, will concentrate on office equipment such as calculators, typewriters and text processors. Franco Tato, currently heading up Triumph Adler AG, Olivetti's West German subsidiary, will lead the office group.

Notable for their absence from the senior management lineup are Vittorio Levi, vice-president of operations and Elserino Piol, vice-president of strategy. Whether they will be staying with the company is unclear.

What about our relationship?

Another question posed but not answered by the reorganization is what impact it will have on Olivetti's relationship with AT&T.
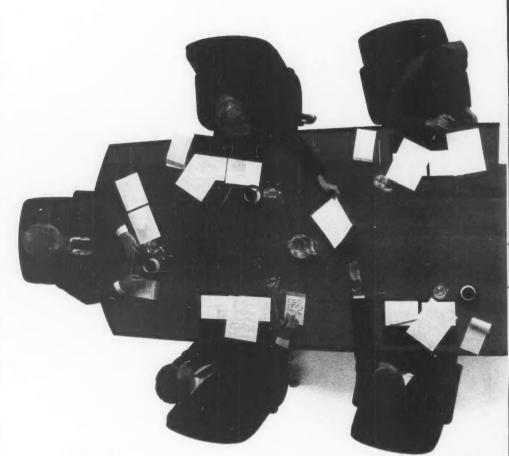
The two companies have had an often-troubled relationship since they became strategic partners in 1983. The U.S. giant owns a 22% share of Olivetti, and the two companies have cross-marketing agreements under which AT&T markets Olivetti PCs in the U.S. and Olivetti sells AT&T minicomputers and private branch exchanges in Europe.

Olivetti is said to be unhappy with declining purchases of its PCs by AT&T. Earlier this year, the Italian firm launched a line of minicomputers, the LSX series, that cast doubt over its commitment to pushing AT&T's 3B family.

In April, Carlo de Benedetti rebuffed AT&T overtures concerning an increase in its capital share and management control in Olivetti. In May, Olivetti officials acknowledged that the allies were reassessing their relationship.

Friction between the firms has been exacerbated by differences in management style and downward pressure on the dollar/lira exchange rate, insiders said.

What do you do when the

The business communications network you see above is a simple one. To make it work efficiently all you really have to do is speak, or pass along a sheet of paper.

As your business grows, though, things get more complex. Oceans and land masses separate your communication points. And an inefficient network can slow your company's growth.

That's when it becomes absolutely necessary to work with a networking expert. A partner that can understand your business, provide reliable connections and make it easy to leverage your existing resources.

At Codex we've been specializing in networking for the last 26 years.

The world's foremost corporations are among our clients. And our parent company, Motorola, is one of the most notable electronics corporations worldwide.

We've been actively involved in the move-

EXECUTIVE CORNER

Network Equipment Technologies, Inc. (NET) has appointed **Frederick E. Glave**, 48, to the new position of senior vice-president and general manager of the private networks division.

Glave, who is a 25-year veteran of Northern Telecom, Inc. and Bell-Northern Research Ltd., will assume general management responsibility for the operations of all four of NET's product divisions.

NET also announced the appointment of **Roger T. Hobbs**, 45, as senior vice-president and general manager of the national marketing division.

Steven E. Schlumberger, who

served as general manager of the division for the past four years and built the current sales organization, was named vice-president of marketing.

Comdisco Disaster Recovery Services, Inc. has named **John A. Jackson** executive vice-president. He was previously senior vice-president for operations at Comdisco.

The board of directors of Alpha Microsystems has elected **John S. Cain** president of the firm.

Cain will continue as chief operating officer and chief financial officer. Former

President **Robert B. Hitchcock** will continue as chairman of the board and chief executive officer.

Storage Technology Corp. announced that **A. Donald Stratton** has joined Storage Tek as vice-president of corporate quality. Stratton will head the corporate quality group, which is part of the Storage Tek customer satisfaction function.

Prior to joining Storage Tek, Stratton was a quality expert during a 30-year career with AT&T, where he managed various quality activities relating to engineering and installation.

Decision Industries Corp. has announced the appointment of **Donald E. Lemon**,

former president and CEO of Alcatel Information Systems, as president and CEO of Decision Data Computer Corp.

System Industries, Inc. recently appointed **Donald C. Dickson** to assume the position of vice-president of field engineering.

Dickson was most recently System Industries' vice-president of sales operations. He was founder and president of Focused Training Systems, Inc.

Archive Corp. has appointed **George R. Rea** to the position of vice-president and general manager of the data storage division.

Rea came to Archive in June to provide interim management services as acting general manager for the data storage division when M. Thomas Makmann resigned his position as vice-president.

Bruce Elmblad has teamed up with Bachman Information Systems, Inc. to direct the company's international efforts to organize a distribution network in Western Europe and a subsidiary in the UK.

Jon Bachman, director of international sales and support, will be directing the company's sales and support operations.

Elmblad was a founder of Prime Computer, Inc.; a cofounder of Inforex, Inc., a manufacturer of computer peripheral equipment; and director and chairman of Telxon Corp., a manufacturer of portable data entry equipment.
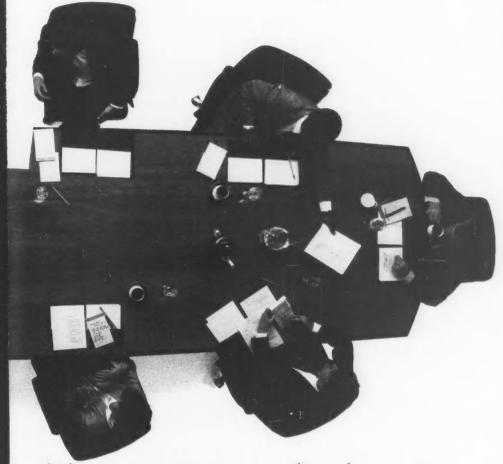
Modular Computer Systems, Inc. announced the appointment of **Guy Rabbat** as president and chief executive officer of the company. Rabbat was formerly vice-president of research and development at Modular Computer.

MAD Intelligent Systems, Inc. has announced the appointment of **William J. Griffin** to the post of senior vice-president of finance and chief financial officer.

Griffin joins MAD from IBM, where he served as corporate director of financing at IBM's Armonk, N.Y., headquarters.

Institutional Communications Co. announced the appointment of **Gordon "Don" Hutchins Jr.** to the position of president and chief executive officer of the company.

Prior to joining Institutional Communications, Hutchins was senior vice-president of sales and marketing at Williams Telecommunications Group, based in St. Louis.

Lecht

despite the fact that its home marketplace is no larger than Montana and its population is half that of the U.S. is a phenomenon. NTT reached this height based on 1987 sales of $46.6 billion and profits of $2.4 billion, reflecting a 6% and 52% increase, respectively, over the previous fiscal year.

In comparison, IBM's sales were $54.2 billion, and profits were $5.3 billion, up 6% and 10%, respectively. AT&T's sales were $33.6 billion, and profits $2.0 billion, down 2% and up 43%, respectively.

While profits are the major determining factor in the valuation of shares in U.S. companies, such is not the case in Japan. In the two years following its 1985 divestiture by the Japanese government, NTT's shares skyrocketed for reasons that had little to do with profits.

Even with the impressive increase in NTT's profits from 1986 to 1987, these, if viewed as a percentage of sales, were less than half those of IBM's.

Private, public offerings
A total of 1.9 million shares were initially offered only to NTT employees at roughly $5,000 each shortly after the company's divestiture by the Japanese government in 1985. A second offering of the same number of shares to the Japanese public — foreigners were excluded — was held at approximately $20,000 per share. In the first week of this month, NTT held a third offering of 1.5 million of its shares to anyone who could cough up the cash — roughly $17,000 each.

Some brokers, the Japanese government and NTT executives are bemoaning the fact that shares have slipped in value from their high of approximately $20,000 each, but how they know what the price should be remains a mystery to me. Because NTT's victory in the race for world financial supremacy by value of its shares cannot immediately be traced to profits, one might be tempted to conclude that the Japanese government — its former sole owner — had been giving it a massive dose of financial steroids.

That NTT's stock performance was achieved during a period in which competition in communications was introduced in Japan lets us know just about how much the Japanese public expects the newly competing companies to erode NTT's business. Like the newly competing U.S. companies vis-a-vis AT&T, they can do little but resell the prevailing communications company's facilities after buying them at wholesale prices.

While this explains the lackluster increase in sales at NTT

and the decline in AT&T's case, it also explains the whopping double-digit (40% plus) increases in profits for both companies. It is instructional to envision the extreme case, in which a communications-cum-computer company, which owns just about all the communications facilities in a country, gradually changes its business from serving the general public to doing little more than selling to a few wholesalers. Sales volume plunges indeed but not as fast as operating expenses — there are far fewer clients to deal with, no marketing requirements, less end-user maintenance — and profits soar.

In the next financial high-tech olympics, we need not wonder too much how today's top three will rank. Since none of the three really competes with the others and there is no other company in their class, their positions as the top three high-tech firms seem fairly secure.

Of course, should the long-awaited ISDN day arrive when the powers that today's computers provide can be offered over telephone lines, the situation could change. With ISDN, we can expect a vigorous battle between IBM and its two top-ranking nonrivals to occur.

But until then, it's my guess that only a change in dollar/yen exchange rates will unseat NTT from its gold medal position as *ichi ban* largest in our high-tech world — and in any other as well.

Lecht is an IDG News Service correspondent based in Tokyo.

Theirs.

The second most reliable impact printer did this much before it stopped. It wound up in the repair shop after 7,000 hours or ten months of printing.

PE12805

Fresh face

who will begin his stint as CEO of Prime when current CEO Joe M. Henson steps down "several months from now," according to a company spokesman — spent his first week as Prime's new chief operating officer, executive vice-president and board

member meeting with employees and carrying out his self-styled immediate role.

"The man is incredibly astute, both technologically and marketwise," said David Taylor, director of consulting at the Gartner Group, Inc., a market research firm based in Stamford, Conn.

Talking to industry observers about Craig's stewardship of GE

Information Services, Taylor said, "you get two reactions: One is that he did a very good job of directing the division, of providing a vision of where GEIS should be and how to get there."

The other, he said, is that Craig was never wholly successful in communicating his value-added network-based vision to GE top managers.

"If you can't sell your idea to

management, no matter how technologically good it is, you're vulnerable," said Taylor, who said he sees Craig as an admirably equipped leader whose mission at GE Information Services was aborted.

At Prime, Taylor noted, Craig himself will be top management, presumably empowered to stay whatever course he chooses.

There is a question on many

minds as Craig approaches his turn at the helm of one of the major companies attempting to navigate through the increasingly perilous minicomputer market: Will that course be one of attempting to conquer new markets, probably through acquisitions, or one of concentration on the computer-aided design and manufacturing (CAD/CAM) market?

Guided, he said, by factors of law, business practice and simple prematurity, Craig declined to comment at this time.

However, the CEO-elect

> "THE MAN is incredibly astute, both technologically and marketwise."
>
> DAVID TAYLOR
> GARTNER GROUP

conceded that it would not be out of line to assume that "becoming very expert in vertical acquisitions" is part of his curriculum as he educates himself in the ways, means and needs of his new company.

Major step

Prime took another major step in that direction last week with its agreement to buy GE's Calma CAD/CAM business.

With the computer industry, and particularly the minicomputer sector, in a well-cataloged state of turmoil, "a company needs a leader who is sensitive to market shifts — who, hopefully, can see them coming before they happen but who can at least react decisively once they do," said Kathryn Korostoff, an analyst at Framingham, Mass.-based market research firm International Data Corp. "I think Tony Craig is that kind of man."

Craig, Korostoff said, "is the take-action, hands-on kind of person who will reevaluate Prime's strategic direction if he thinks it's needed — who will make decisions and follow them through."

DEC pros still hard to come by

But more employers seek application experience with technical versatility

BY SHERYL KAY
SPECIAL TO CW

Today, a career in a Digital Equipment Corp. shop does not necessarily mean a job in a laboratory. Many major corporations now use DEC hardware and software for developing standard business applications, a dramatic change from the situation 10 years ago.

Spurred by this growth, the demand for DEC professionals in the commercial arena is strong nationwide, according to Jack Schwartz, managing director for the recruiting firm Source EDP in San Mateo, Calif. "The demand for VAX people is tremendous, and the supply hasn't caught up yet," he says.

Unlike IBM mainframe shops, in which developers of business applications traditionally have worked in Cobol, DEC VAX shops make use of several languages. In addition to Cobol, Fortran and C, they are beginning to rely on fourth-generation languages such as Oracle Corp.'s Oracle and Relational Technology, Inc.'s Ingres. Employers generally require programmers to be proficient in one or two of these languages.

According to Hershel Wald-

ner, president of American Data Search and Management Consultants in New York, 45% of the searches his organization has been asked to conduct this year have been for professionals with DEC experience, up from 10% a decade ago. At that time, virtually none of the positions involved business applications; now almost all the prospective employers are banks and brokerage firms.

"Specifically, the clients want VAX experience with the VMS operating system and a combination of several languages, including Cobol, Basic, Fortran and C," Waldner says.

Wanted: DEC developers

But clients of the firm know that DEC developers are so hard to find that they overlook otherwise typical requirements. "Managers tell us not to even worry about the applications background of the candidate because they know there may not be a competitor with a parallel DEC environment," Waldner says.

But Schwartz says the rapidly growing ranks of banks and brokerage houses that have installed VAXs are getting more selective. "A couple of years ago, they were dying for VAX people, so they took them from any environment, including very

technical engineering groups," Schwartz says.

"Now they still hire engineering types, but more often the employers ask for people who have some financially related background," Schwartz adds. That qualification is particularly important for people working with users to design systems.

"Many of the DEC business environments I've seen have been similar in that the employees did a little of everything," says Jim Welborne, director of information resources at Crowe, Chizek and Co., a South Bend, Ind., accounting firm that has been developing Cobol business applications on DEC equipment for more than 12 years.

In Welborne's shop, technicians do programming as well as analysis. "You might even sit at the Help desk once a week just to remember what it's like to talk

> "**M**ORE AND more companies of different types are acquiring VAX equipment, and consequently the job options are much greater than in the past."
>
> JACK SCHWARTZ
> SOURCE EDP

Salary ranges for technicians with DEC experience can be large. For example, a DEC programmer/analyst with three to five years of experience may earn between $30,000 and $60,000 a year. "If the person comes in with DEC hardware/ software background and also the knowledge of the business application, he can parlay that applications knowledge into additional dollars," Waldner says.

Little of this, little of that

DEC professionals might find themselves undertaking a relatively broad variety of tasks.

to people," he adds.

This practice can be a boon for professionals who want to get involved with all aspects of a project, says Hank Livingston, a systems manager at Champion International in Courtland, Ala., where several business applications are running on VAXs. "Those people know more about a project. They don't just have one piece of the puzzle to work on; they've got the whole puzzle," he says.

In addition to this variety of tasks, DEC professionals are gaining mobility among employers with the growing number of

VAX installations, Schwartz notes.

"More and more companies of different types are acquiring VAX equipment, and consequently the job options are much greater than in the past," Schwartz says.

The corporate profile

Professionals interested in identifying companies that use DEC equipment for business development, or that may eventually do so, might look for a specific corporate profile.
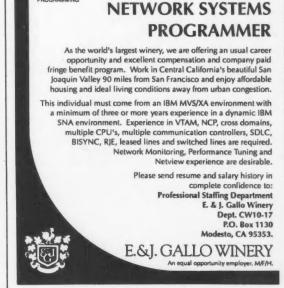
"DEC has taken the approach that rather than take IBM head-on, they are going to focus on areas in which they are strong, and this certainly includes providing business systems to companies with heavy networking requirements," says Prabhat Andleigh, vice-president of technology at Lobb Systems, Inc., a Wakefield, Mass.-based systems integration firm.

DEC can provide a company with a very small system and then cluster it later for very heavy distributive processing, he says, so any company with regional offices and networking requirements may be a likely candidate for DEC equipment.

"Where there are decentralized operations and decentralized decision-making, the company needs a system that can remain common across the board and provide growth," Andleigh says.

Kay is an MIS human resources consultant based in Tampa, Fla.

CAREER INDEX

August 1988 computer recruitment advertising activity*

PERCENT OF SPACE PLACED BY VENDOR VS. USER COMPANIES

	National	Western region	Midwestern region	Eastern region
Vendor	45.54%	33.24%	72.89%	44.73%
User	54.46%	66.76%	27.11%	55.27%

*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

SOURCE: CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATA BASE

Be cautious with used DECs

Though bargains abound, ensuring maintenance must be top priority

BY DAVID GABEL
SPECIAL TO CW

Buyers about to venture into the secondary market for computers and peripherals from Digital Equipment Corp. should be aware of two salient points: The first is that there are bargains to be had. The second is that one should be particularly cautious in the relatively freewheeling DEC secondary market. Buyers should be careful to ensure that maintenance is available and that provisions for it are spelled out in purchase agreements.

"Prices can run anywhere from 15% off list to 75% off list, depending on the piece of equipment," says Dennis Lynch, owner of Merida Trading Group, a dealer of used DEC equipment in Woburn, Mass.

A used DEC Microvax II, introduced in 1985, is expected to carry a list price half that of a new system by January 1989 and 15% of it by 1990, Lynch says. Other systems are expected to be subject to the same sort of price decline.

The relatively weak demand underlying these discounts stems partly from DEC's frantic pace of technological innovation. New technology quickly leaves the old obsolete, so the older equipment rapidly falls in price. The user not needing leading-edge products can save a bundle.

Stay in tune

But in taking advantage of bargains, cautious users would do well to inform themselves about the market and its operators. The expertise of dealers and their support capabilities vary from extensive to none.

Maintenance is important in this market as in any other. One option is to contract with DEC itself. "We provide service on any equipment we build, new or used, if it is in a serviceable environment," a DEC spokesman says. DEC, like IBM, requires the equipment to meet certain standards. The company will inspect equipment and bring it up to the specifications if necessary.

Again like IBM, if DEC removes a piece of its equipment that it has maintained and reinstalls it within 90 days, the company will charge a one-month service fee for the removal, a two-month fee for the reinstallation and continue to maintain the equipment.

However, dealers of used equipment say DEC maintenance is provided by autonomous district service centers that operate as profit centers,

problem at the end-user level."

Bob Fagley, DEC's group manager for corporate accounts field service, says such glitches occur only once or twice a month. "It's in the 1% to 2% range, and when such a glitch happens, it's always resolved over the phone in a short time."

Fagley advises buyers of used equipment to make sure that the dealer guarantees that the equipment is acceptable for maintenance. "The buyer should insist that the dealer delivers the certificate of maintainability to

> "THE BUYER should insist that the dealer delivers the certificate of maintainability to him upon purchase."
>
> BOB FAGLEY
> DEC

and that policies may not be consistently implemented. A district manager, for example, may not want to certify a piece of equipment for maintenance.

"The corporation may support its policies," says C.D. Smith, owner of Houston dealer C.D. Smith and Associates, Inc. and president of the Digital Dealers Association (DDA), "but often there is a four- or five-day

him upon purchase," he says.

The DDA seeks to establish an orderly market for used DEC equipment to boost volume and pump up resale values. That strategy meets with approval from DEC. "We believe that ease of movement of our products increases their value in the aftermarket," Fagley says.

One characteristic of an orderly market is reliability on the

part of dealers. Smith says there are 200 to 300 dealers in the market, and their maintenance services range from bringing in DEC to providing maintenance themselves to selling with no guarantees or warranties.

Secondary pitfalls

The experience of Don Roach, operations manager at Breuer & Co., a Boston software developer, illustrates some of the pitfalls of the used DEC market and the value of a vendor that will deal with them.

Roach's firm bought a used DEC VAX-11/730 and discovered that a disk drive would not boot. DEC sent over two maintenance workers, including a disk specialist, who spent several days working on the problem without success. Finally, the dealer arranged for one-day delivery of a new drive.

Breuer & Co. also bought a used VAX-11/750 that DEC personnel could not get running. After a day, the DEC crew found a bad memory-controller board, which the dealer replaced in less than an hour, again without charge. Such rapid dealer response obviously pleased Roach.

Gabel is a free-lance writer and a former data center manager based in Northport, N.Y.

The BoCoEx index on used computers

Closing prices report for the week ending Oct. 7, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$625	$900	$400
XT Model 086	$1,100	$1,250	$900
XT Model 089	$1,300	$1,575	$1,050
AT Model 099	$2,200	$2,400	$1,700
AT Model 239	$2,600	$2,900	$2,300
AT Model 339	$3,000	$3,650	$2,500
PS/2 Model 30	$1,550	$1,700	$1,300
PS/2 Model 50	$2,350	$2,500	$1,900
Compaq Portable I	$775	$975	$650
Portable II	$1,850	$2,000	$1,650
Portable III	$2,900	$3,550	$2,575
Portable 286	$2,075	$2,400	$1,675
Plus	$1,125	$1,250	$800
Deskpro 20-MHz	$1,025	$1,450	$975
Deskpro 286	$2,575	$3,150	$2,000
Deskpro 386	$4,600	$5,100	$4,100
Apple Macintosh 512	$700	$900	$550
512E	$775	$925	$600
Plus	$1,100	$1,325	$950
Plus 20-MHz	$1,425	$1,450	$1,300
SE	$1,950	$1,950	$1,700
SE 20-MHz	$2,400	$2,675	$2,000
II	$5,250	$5,250	$4,500
NEC Multispeed EL	$900	$950	$650
Toshiba T5100	$4,100	$4,500	$3,600

INFORMATION PROVIDED BY THE BOSTON COMPUTER EXCHANGE CORP.

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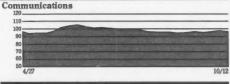
Upcoming Computerworld Spotlight Sections
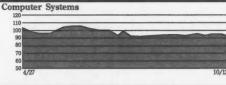
Issue Date	Topic	Ad Closing Date
Nov. 14	PC Graphics	Oct. 28
Dec. 5	LAN's	Nov. 18
Dec. 19	IBM-Compatible PCs/PS2 Market Products/Monitors	Dec. 2

STOCK TRADING INDEX

S&P 500 stock index

CW stock index

Indexes	Last Week	This Week
Communications	98.8	97.3
Computer Systems	95.7	93.6
Software & DP Services	102.3	100.5
Semiconductors	56.2	56.5
Peripherals & Subsystems	79.8	77.8
Leasing Companies	120.2	116.3
Composite Index	85.5	83.9
S&P 500 Index	114.4	115.3

Communications

Computer Systems

Software and DP Services

Semiconductors

Peripherals and Subsystems

Leasing Companies

CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCT. 12, 1988

EXCH		52-WEEK RANGE (1)		CLOSE OCT. 12 1988	WEEK NET CHNGE	WEEK PCT CHNGE

Communications and Network Services

EXCH						
N	AMERICAN INFO TECHS CORP	100	74	93.75	0.4	0.4
Q	ANDREW CORP	19	11	16.25	-0.3	-1.5
Q	ARTEL COMM CORP	3	1	1.75	-0.3	-15.2
N	AT&T	34	20	26.5	0.1	0.5
Q	AVANT GARDE COMP INC	1		0.75	-0.1	-14.5
Q	AVANTEK INC	13	5	5.75	0.0	0.0
N	AYDIN CORP	32	16	21.625	-0.1	-0.6
N	BELL ATLANTIC CORP	80	61	72.125	0.8	1.1
N	BELLSOUTH CORP	44	29	40.75	0.5	1.2
Q	COMPRESSION LABS INC	6	3	3	-0.1	-4.0
Q	COMPUTER NETWORK TECH	4	1	1.313		3.7
O	CONTEL CORP	38	25	37.25	-0.4	-1.0
Q	DATA SWITCH CORP	10	4	6.625	-0.1	-1.9
Q	DIGITAL COMM ASSOC	41	20	22.5	-1.5	-6.3
Q	DYNATECH CORP	29	14	20.25	-0.3	-1.2
Q	FIBRONIX INTERNATIONAL INC	5	2	3.375	-0.1	-3.6
Q	GANDALF TECHNOLOGIES	8	5	5.875	-0.6	-9.6
N	GENERAL DATACOMM INDS	7	3	3.875	0.1	3.3
N	GTE CORP	44	29	42.25	-1.0	-2.3
Q	INFOTRON SYS CORP	14	5	11.25	-1.0	-8.2
N	ITT CORP	65	42	50.375	1.0	2.0
Q	M A COM INC	9	7	9.875	0.0	0.0
Q	MCI COMMUNICATIONS CORP	21	7	19.625	-0.8	-3.7
Q	NETWORK EQUIPMENT TECH INC	25	12	15.5	-0.5	-3.1
Q	NETWORK SYS CORP	9	7	9.5	-0.6	-6.2
N	NORTHERN TELECOM LTD	21	14	18.5	0.6	3.5
Q	NOVELL INC	31	12	28.75	-0.8	-2.5
N	NYNEX CORP	78	58	65.875	0.4	0.6
N	PACIFIC TELESIS GROUP	33	23	30.125	0.0	0.0
A	PARADYNE CORP	6	4	5.75	0.1	2.2
A	PENRIL CORP	5	1	4.375	0.3	6.1
N	PLESSEY PLC	37	23	27.75	1.1	4.2
Q	SCIENTIFIC ATLANTA INC	16	8	11.625	-0.8	-6.1
N	SOUTHWESTERN BELL CORP	45	22	40.125	0.3	0.6
N	3 COM CORP	24	12	18.25	0.0	0.0
N	U S WEST INC	59	43	58.125	1.3	2.2

Computer Systems

EXCH						
Q	ALLIANT COMPUTER SYS	11	4	4.063	-0.7	-14.5
Q	ALPHA MICROSYSTEMS	8	3	6.625	0.1	1.9
Q	ALTOS COMPUTER SYS	15	7	6	-0.8	-8.6
N	AMDAHL CORP	28	10	19.125	0.5	2.7
Q	APOLLO COMPUTER INC	19	8	8.25	-0.4	-4.3
Q	APPLE COMPUTER INC	55	28	38.75	-2.1	-5.2
Q	BOLT BERANEK & NEWMAN	23	12	13.75	0.3	1.9
A	BRITTON LEE INC	4	1	2.25	-0.1	-5.3
N	COMPAQ COMPUTER CORP	77	34	52	-2.4	-4.4
Q	COMPUTER AUTOMATION INC	14	4	4.625	0.0	0.0
Q	COMPUTER CONSOLES INC	9	6	8.25	-0.3	-2.9
N	CONCURRENT COMP CORP	20	11	19.813	0.0	0.0
N	CONTROL DATA CORP DEL	36	18	21.5	-0.1	-0.6
N	CONVERGENT TECH	7	3	6.438	0.0	0.0
N	CONVEX COMPUTER CORP	11	6	8.625	0.0	0.0
Q	CRAY RESH INC	94	47	67.875	-1.6	-2.3
N	DAISY SYS CORP	12	5	7.75	-0.4	-4.6
N	DATA GEN CORP	34	16	19.125	0.0	0.0
N	DATAPOINT CORP	9	3	4.875	0.0	0.0
Q	DELL COMPUTER CORP	12	8	10.125	0.5	5.2
N	DIGITAL EQUIP CORP	190	88	90.5	2.0	2.3
Q	FLOATING POINT SYS INC	9	3	2.625	0.0	0.0
N	GOULD INC	34	8	23.125	0.3	1.1
N	HARRIS CORP DEL	39	22	26.625	-0.9	-3.2
N	HEWLETT PACKARD CO	68	36	49.25	0.5	1.0
N	HONEYWELL INC	79	49	64.625	1.0	1.6
N	IBM	152	102	117.5	3.6	3.2
Q	INFORMATION INTL INC	16	9	14	-0.3	1.8
Q	IPL SYS INC	4	1	3.375	-0.3	-6.9
Q	MAI BASIC FOUR INC	21	9	15.375	-1.6	-9.6
N	MATSUSHITA ELEC INDL LTD	230	103	174	-3.5	-2.0
Q	MEGADATA CORP	5	2	1.75	0.1	7.7
Q	MENTOR GRAPHICS CORP	37	14	27.375	-1.6	-5.6
Q	NBI INC	10	2	2.125	-0.4	-15.0
N	NCR CORP	78	50	58	1.5	2.7
N	PRIME COMPUTER INC	24	12	13.625	-0.6	-4.4
Q	PYRAMID TECHNOLOGY	16	5	13.375	-0.4	-2.7
Q	SILICON GRAPHICS CORP	25	11	16	-1.0	-5.9
Q	STRATUS COMPUTER	31	14	22.75	-2.3	-9.0
Q	SUN MICROSYSTEM INC	44	22	28.25	-6.5	-18.7
Q	SYMBOLICS INC	3	1	1	0.0	0.0
Q	SEQUENT COMPUTER SYS INC	19	9	17.125	0.3	1.5
N	TANDEM COMPUTERS INC	31	12	13.75	-0.4	-2.7
N	TANDY CORP	54	28	41.25	-0.8	-1.8
N	ULTIMATE CORP	33	9	10.125	0.0	0.0
N	UNISYS CORP	45	24	31.125	0.0	0.0
A	WANG LABS INC	19	9	9.25	0.0	0.0

Software & DP Services

EXCH						
Q	ADVANCED COMP TECH	6	1	1.813	0.0	0.0
Q	AMERICAN MGMT SYS INC	19	9	15.375	1.4	9.8
Q	AMERICAN SOFTWARE INC	16	6	15.125	0.3	1.7
Q	ANACOMP INC	12	4	9.125	-0.4	-3.9
Q	ANALYSTS INTL CORP	9	4	9.125	0.4	4.3
Q	ASHTON TATE	31	13	22.75	-1.3	-5.2
Q	ASK COMPUTER SYS INC	16	6	12.375	-0.6	-4.8
Q	AUTODESK INC	31	12	26.25	-1.5	-5.4
Q	AUTO DATA PROCESSING	47	16	37.25	-0.6	-1.7
N	BOOLE & BABBAGE INC	10	5	9.5	0.1	1.3
Q	BUSINESSLAND INC	14	7	13	-0.3	-1.9
N	COMPUTER ASSOC INTL INC	35	15	28.75	0.9	3.1
Q	COMPUTER HORIZONS CORP	13	7	6.25	0.4	4.8
Q	COMPUTER SCIENCES CORP	67	38	48.625	0.3	0.5
Q	CORPORATE SOFTWARE	15	5	9.75	-1.5	-13.3
Q	COMPUTER TASK GROUP INC	17	9	16.5	1.9	12.8
Q	COGNOS INC.	13	6	6.75	0.4	5.9
N	COMSHARE INC	25	12	16	-0.5	-2.4
Q	CULLINET SOFTWARE INC	13	4	5.625	-0.3	-4.3
Q	DUQUESNE SYS INC	22	10	18	0.8	4.3
N	GENERAL MTRS (CLS E)	47	30	41.5	-0.1	-0.3
Q	HOGAN SYS INC	9	3	5.5	0.1	2.2
Q	INFORMIX CORP	28	7	8.75	-0.5	-5.4
Q	INTELLICORP INC	6	2	3.5	-0.3	-6.7
Q	KEANE INC	16	6	13	-0.8	-5.5
N	LOTUS DEV CORP	40	15	15.25	-4.8	-23.8
Q	MANAGEMENT SCI AMER	14	6	7.125	-0.4	-5.0
Q	MICRO PRO INTL CORP	6	2	2.813	-0.1	-2.2
Q	MICROSOFT CORP	75	37	50.625	0.4	0.7
Q	MORINO ASSOCIATES INC	20	7	14.25	-0.8	-5.0
N	NATIONAL DATA CORP	32	20	24	-0.3	-1.0
Q	ON LINE SOFTWARE INTL INC	18	4	5.375	0.4	7.5
Q	ORACLE SYS CORP	22	8	18	-1.3	-6.5
Q	PANSOPHIC SYS INC	24	11	13	-0.5	-3.7
Q	PHOENIX TECHNOLOGIES INC	18	14	14.5	-1.3	-7.9
Q	POLICY MGMT SYS CORP	28	15	23.5	0.3	1.1
A	PROGRAMMING & SYS INC	14	7	13.5	0.5	3.8
Q	RABBIT SOFTWARE INC	4	2	3.125	0.0	0.0
Q	RELATIONAL TECHNOLOGY INC	21	13	14.125	-0.5	-3.4
N	REYNOLDS & REYNOLDS CO	28	14	21.75	0.5	2.4
Q	SEI CORP	22	10	18.75	0.5	2.7
Q	SHARED MED SYS CORP	27	14	15.875	-2.5	-13.6

Semiconductors

EXCH						
N	ADV MICRO DEVICES INC	21	8	9.875	1.1	12.9
N	ANALOG DEVICES INC	18	8	10.875	0.1	1.2
N	ANALOGIC CORP	10	5	6.875	0.0	0.0
Q	CHIPS & TECHNOLOGIES INC	28	8	11.75	0.5	4.4
N	INTEL CORP	40	18	24.75	-0.3	-1.0
Q	LSI LOGIC CORP	14	7	8.875	-1.0	-10.1
Q	MICRON TECHNOLOGY INC	26	5	19.625	-0.9	-4.3
N	MOTOROLA INC	68	35	39.75	-0.1	-0.3
N	NATL SEMICONDUCTOR	21	8	9.875	1.0	11.3
N	TEXAS INSTRS INC	76	36	39.5	0.4	1.0
A	WESTERN DIGITAL CORP	25	11	12.75	-1.3	-8.9

Peripherals

EXCH						
Q	ALLOY COMP.	10	2	2.625	-0.1	-4.5
Q	AM INTL INC	7	3	5.5	-0.1	-2.2
N	AST RESH INC	18	6	8.625	-0.4	-4.2
N	AUTO TROL TECH CORP	6	3	5.25	0.0	0.0
Q	BANCTEC INC	13	5	8.375	0.4	4.7
Q	CIPHER DATA PRODS INC	10	4	8.5	-0.3	-2.9
Q	COGNITRONICS CORP	4	2	2.75	-0.1	-4.3
Q	CONNOR PERIPHERALS	10	7	7.875	0.5	6.8
Q	DATAPRODUCTS CORP	24	7	10.625	-0.3	-2.3
N	DATARAM CORP	9	5	8.5	0.0	0.0
N	EASTMAN KODAK CO	68	39	47	0.6	1.3
N	E M C CORP MASS	24	4	4.125	-0.3	-5.7
N	EMULEX CORP	11	4	10.125	-0.3	-2.4
Q	EVANS & SUTHERLAND	27	14	13.5	-1.5	-10.0
Q	ICOT CORP	8	3	3.125	-0.3	-7.4
Q	INTERLEAF INC	21	7	7.25	-0.8	-9.4
Q	IOMEGA CORP	5	1	3.188	0.1	4.1
Q	LEE DATA CORP	5	3	2.875	0.1	4.5
Q	MASSTOR SYS CORP	3	1	2.188	0.0	0.0
N	MAXTOR CORP	16	6	6.875	0.4	5.8
N	MICROPOLIS CORP	34	8	8	-0.3	-3.0
Q	MINISCRIBE CORP	16	5	8.125	-0.6	-7.1
N	MINNESOTA MNG & MFG CO	77	45	62.125	0.5	0.8
Q	MSI DATA CORP	24	8	23	0.0	0.0
Q	PERSONAL COMPUTER PRODUCTS INC.	7	4	5.125	-0.2	-3.5
Q	PRIAM CORP	3	1	1.563	-0.1	-3.8
Q	PRINTRONIX INC	11	7	9.5	-0.3	-2.6
Q	QMS INC	24	7	7.5	-0.3	-3.2
Q	QUANTUM CORP	16	8	12.625	0.1	1.0
N	RECOGNITION EQUIP INC	13	6	5.75	-0.8	-11.5
N	REXON INC	9	4	6.125	-1.0	-14.0
Q	SEAGATE TECHNOLOGY	23	7	7.875	-0.1	-1.6
N	STORAGE TECH CORP	4	1	1.875	0.0	0.0
Q	TANDON CORP	4	1	1.688	0.0	0.0
A	TEC INC	6	3	3.125	-0.3	-7.4
N	TEKTRONIX INC	36	20	20.375	-1.0	-4.7
Q	TELEVIDEO SYS INC	3	1	0.688	-0.1	-8.3
N	XEROX CORP	80	50	58.125	0.4	0.6

Leasing Companies

EXCH						
Q	AMPLICON INC	17	7	16.25	0.0	0.0
Q	CAPITAL ASSOCIATES INTER-NATIONAL INC	8	4	6.75	0.0	0.0
N	COMDISCO INC	32	12	20.5	-0.8	-3.5
Q	CONTINENTAL INFO SYS	9	4	4.125	-0.4	-8.3
Q	LDI CORPORATION	17	9	12.75	-0.5	-3.8
Q	PHOENIX AMERN INC	5	2	3.5	0.1	3.7
Q	SELECTERM INC	6	3	4.875	-0.4	-7.1

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL

Top section (right)

EXCH						
Q	SAGE SOFTWARE INC.	11	5	7.125	-0.5	-6.6
Q	SOFTWARE PUBG CORP	27	5	23.75	-0.1	-0.5
Q	STERLING SOFTWARE INC	10	6	7.625	0.0	0.0
Q	SUNGARD DATA SYS INC	20	10	15.875	-3.1	-16.4
Q	SYSTEMATICS INC	34	19	28.25	-0.5	-1.7
Q	SYS. SOFT INC.	24	7	23	0.8	3.4
Q	VM SOFTWARE INC	18	7	14.25	-0.3	-1.7

Hitchhiking

DEC stockholders get free ride after price hike announcements

The market at large continued to reflect a wait-and-see attitude on investors' parts last week, but they apparently liked what they saw in the technology sector. Digital Equipment Corp.'s announcement of effective price hikes, for example, helped drive the company's stock up 2½ points to close Thursday at 92.

IBM — whose underwhelming 3% profit gain and 5% rise in revenue for its recently ended fourth quarter were announced Friday — enjoyed a similar gain, closing Thursday at 118%, up 2% points for the week.

Microsoft Corp. picked up 1¾ points, rising to 51½ after the company hinted that encouraging figures will be on display in its forthcoming earnings report for the quarter ended Sept. 30. Meanwhile, microcomputer rival Lotus Development Corp., still feeling the fallout from further delays of the vaunted latest release of its flagship 1-2-3 spreadsheet software, fell 1½ points to a new low of 15¼.

Spurned suitor Daisy Systems Corp. dropped ⅜ of a point to close Thursday at 7⅞ after Cadnetix Corp. rejected its corporate advances; Cadnetix held steady at 8⅜.

NELL MARGOLIS

Program trading still a market linchpin

BY JAMES DALY
CW STAFF

Program trading.

Few phrases ever knifed deeper into the heart of the financial and investor community than those four syllables did last October.

When analysts began to sift through the wreckage of the market's collapse, many Wall Street executives and members of Congress blamed program trading — a complex computer-guided technique in which large blocks of stocks and stock index futures are automatically traded when specific market conditions occur — for dumping large amounts of stock after the fall began and snowballing a bad situation into a disaster.

In the past year, program trading has weathered the slings and arrows of its critics, and although recent reports by the New York Stock Exchange indicate that the practice has slowed over the past year, it remains a vital part of financial trading.

But emotional scars remain; most investment-house representatives seem most comfortable discussing program trading in whispers.

The smoke had barely cleared on Oct. 19's historic 508-point drop in the Dow Jones Industrial Average when program trading became a focal point for criticism. Sen. John Heinz (R-Pa.) immediately called for the suspension of program trading to "at least temporarily unwind the death spiral into which mindless, computer-driven algorithms have driven the market," while a presidential commission faulted program trading for accelerating the crash.

Whipping boy?

Others felt the practice was wrongfully made a scapegoat, blaming jitters about the economy, high interest rates, changes in tax legislation and a worldwide overvaluation of stocks for the tumble.
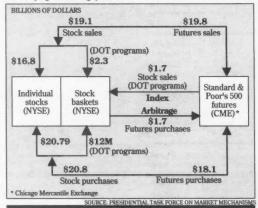
A report prepared by the NYSE last December even noted that "merely trading simultaneously a number of stocks, which is the essence of program trading, can hardly be the cause of whatever problem may exist; nor should we be troubled by the fact that in the last two decades of the 20th century, particular trades are selected by the use of a computer."

Many brokers — including the top three program traders, Morgan Stanley & Co., Bear Stearns & Co. and Merrill Lynch Research — refused to discuss their level of program trading. "It's an extremely controversial issue," a spokesman for Morgan Stanley said.

But a series of monthly reports on program trading issued by the NYSE indicate that enthusiasm for the practice may be cooling. Program trading in August dipped to 8.1% of the Big Board's average trading volume of 144.7 million shares a day, according to the report, down from a level observers placed at 15% to 20% a year ago.

Still, the NYSE is not about to take chances. Earlier this year, the exchange listened to the cries of nervous investors who claimed that computers could increase volatility in a falling market; the Big Board has now installed a collar that prohibits certain forms of computer-assisted trading activity on days when the Dow falls by more than 50 points.

But many more basic problems still exist. According to a recent report, "Computers in Financial Trading," issued by Elsevier Advanced Technology Publications in New York, many commentators who attacked program trading for having contributed to the volatility of the U.S. stock markets were not even certain what they were attacking.

Author James Essinger stated that financial traders usually interpret the term as involving a portfolio, or program, of shares, with computers only being used to keep a record of the progress of the sale. In contrast, the NYSE includes both computer-assisted index arbitrage and portfolio insurance-trading strategies under the program-trading umbrella.

Get with the program

More than 20% of the stock sales on October 19, 1987 were generated by the New York Stock Exchange's Designated Order Turnaround (DOT) program trading system

BILLIONS OF DOLLARS

$19.1 Stock sales		$19.8 Futures sales
	(DOT programs)	
$16.8	$2.3	
	$1.7 Stock sales (DOT programs)	
Individual stocks (NYSE)	Stock baskets (NYSE)	Index Arbitrage	Standard & Poor's 500 futures (CME)*
		$1.7 Futures purchases	
$20.79	$12M (DOT programs)	
$20.8 Stock purchases		$18.1 Futures purchases

* Chicago Mercantile Exchange

SOURCE: PRESIDENTIAL TASK FORCE ON MARKET MECHANISMS

Black Monday
FROM PAGE 1

flow. To fight back, the Tandem Computers, Inc. hardware used in the exchange's limit order system has been upgraded to run 50% faster; now it is able to handle 600 million shares in a day, vs. 450 million a year ago.

To counteract the problem of communicating information to its member firms, the NYSE has made capacity improvements to its common message switch, which is the system that interfaces to the exchange's security brokerage member firms.

"We've increased the capacity from a peak 95 message rates per second to 120, and we're going up to 140 by the end of the year," said Geri DiCostanzo, Securities Industry Automation Corp.'s senior vice-president for the NYSE trading systems development and operations.

In addition, the NYSE has committed another $200 million to technological improvements for the next five years, and an Operations Advisory Committee, to be overseen by NYSE President Richard Grasso, will coordinate an industrywide systems upgrade.

The exchanges, however, were not the only culprits of the disruption on Wall Street during the week of Oct. 19. While there were problems communicating the trading information to member firms, those firms often had their own problems handling the massive amounts of information they received.

"One of the reasons the trading hours were curtailed briefly following the 19th was that the member firms simply had such a backlog of trading information paperwork," said Linda Coleman, executive vice-president of planning and development at the Boston Stock Exchange and a former NYSE vice-president.

Boosting systems

Many of those member firms have since upgraded their systems. Walter Raquet, senior vice-president of marketing and new products at over-the-counter trading firm Herzog, Heine, Geduld, Inc. in New York, said his company's volume jumped to about 18,000 trades Oct. 19 from 8,000 the previous Friday.

"Normally, we would handle 20,000 to 30,000 ticks [stock price changes] a day," Raquet said, "but we had 30,000 ticks in the first 20 minutes" of Oct. 19, and the systems got bogged down, he said. Now, the firm's software has been reprogrammed to handle greater throughput, so "if we got 30,000 ticks in 15 minutes, we could handle it."

Tandem, whose fault-tolerant systems are widely used by securities firms, has seen sales to those companies climb 30% this year, said Ray Villareal, securities industry marketing manager at Tandem.

The exchanges have also put a number of procedural changes into effect to ensure that bottlenecks will not wreak havoc on the exchange floor again. Among them are the following:

• Completed upgrades to hardware and improvements in software at many of the domestic exchanges, as well as planned future upgrades. The NYSE's goal is to manage a volume of 600 million shares a day as smoothly and efficiently as it already processes its daily volume of 200 million shares. By the early 1990s, and perhaps as early as late next year, the NYSE hopes to have the ability to handle one billion shares a day.

• A series of initiatives approved by the NYSE and the Chicago Mercantile Exchange (CME) — based in part on recommendations of the Brady Commission and the Presidential Working Group — including coordinated "circuit breakers" that would, for instance, halt trading on the NYSE for one hour if the Dow Jones industrial average falls 250 points in one day. The initiatives are contingent on adoption by all of the domestic exchanges and Securities and Exchange Commission approval, which is expected to take place this week.

• A 20% expansion of the NYSE's trading floor.

• A reduction in paperwork on the NYSE floor by increasing the number of electronic display books. The books facilitate the recording, execution and reporting of orders.

Now, 1,500 stocks are handled through 400 books, compared with the 215 books handling 476 stocks the day of the crash.

The initiatives and regulations are also intended to bring better communications among the domestic markets. An inter-exchange hot line has been established for the NYSE, the American Stock Exchange, CME and the Chicago Board of Trade for communication and coordination during a crisis. Others will likely participate.

"Telephone lines have been set up between the exchanges both at the chairman level and on the trading-floor level to keep immediate communications there," the Boston Exchange's Coleman said.

More controls

"There really weren't enough circuit breakers built into the system," said Jim Eckler, vice-president of information systems and strategic planning at Morgan, Keegan & Co., a Memphis-based brokerage firm. "The regulatory agencies are only now moving more policy controls into place to prevent a stock panic."

Coleman said the Boston Exchange is committed to the initiatives put forth by the NYSE and CME and would likely abide by them if the situation warranted it prior to the SEC approval.

The Presidential Task Force on Market Mechanisms, also known as the Brady Commission, found that a primary cause

Former exchange exec *Mark Smith*

Feds supply more studies than ideas

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The October 1987 stock market crash spawned a presidential commission, four major studies, several congressional hearings and a few frenzied calls for the suspension of program trading. But the list of actual government actions to prevent a recurrence of Black Monday is quite short.

"In terms of legislation, it's really been a bust," said Julie Sedky, a political analyst at Washington Analysis Corp., a securities research firm. "Congress didn't know what to do with all of the conflicting advice that it got . . . so it didn't do anything."

Indeed, the studies, agencies and exchanges rarely agreed on what caused the volatility on Black Monday or how to fix it. For example, the Presidential Task Force on Market Mechanisms — chaired by Secretary of the Treasury Nicholas Brady and known as the Brady Commission — and the Securities and Exchange Commission (SEC) said program trading was the culprit, but the Commodity Futures Trading Commission (CFTC) disagreed.

The Brady hunch

In the regulatory field, the Brady Commission urged the Federal Reserve Board to become a superregulatory agency, the SEC chairman sought to wrest control over stock-index trading from the CFTC and the CFTC opposed both proposals.

Lacking any consensus in the executive branch, Congress put the issue off until next year, when a new administration is likely to have more enthusiasm for securities trading reform, Sedky explained.

There has been virtually no change in the federal government's regulatory structure, as the Brady Commission recommended, to better coordinate the stock and futures markets, which effectively behave as one market because of high-speed computer links. Regulation is now split between the SEC and the CFTC.

The commission said a single agency must have authority to monitor and resolve intermarket problems in order to "reduce the possibility of destructive breaks and to deal effectively with such episodes should they occur."

Edward I. O'Brien, president of the Securities Industry Association in New York, said that government inaction is contributing to the low level of investor confidence in the stock market — leaving most trading in the hands of professional and institutional investors.

"There still isn't a process in place to slow or stop the markets if necessary, and there still isn't agreement on selecting one regulator" to coordinate rules in the stock and futures markets, O'Brien said in a statement.

Perhaps the most significant government action is forthcoming from the SEC. Sometime in the next few weeks, it is expected to approve a "circuit breaker" proposal submitted by the New York Stock Exchange and the Chicago Mercantile Exchange in July.

The circuit breaker plan would halt trading across markets for one hour if the Dow Jones industrial average fell 250 points or more in a single day or if the futures market dropped in a similar fashion. The plan would also require an additional two-hour trading halt if the Dow fell another 150 points.

NASD skeptical

The National Association of Securities Dealers (NASD) said it opposes marketwide circuit breakers but reluctantly agreed to go along with the plan at the request of the SEC.

NASD, which runs the over-the-counter stock market, believes that circuit breakers will increase market volatility instead of curbing it.

Supporters argued that marketwide trading halts are necessary because the stock and futures markets are interrelated. If one market breaks down, they said, that transmits intense selling pressure to the markets that remain open.

SEC spokeswoman Mary M. McCue said several steps have been taken to prevent a recurrence of Black Monday. One is that a pilot program has been approved for cross-margining of stock options and futures positions by professional trading firms. This is intended to add liquidity to U.S. financial markets in times of crisis.

Also, telephone hot lines between the stock, futures and options markets have been established to share information such as opening prices.

WITH THE firm's upgraded system, "If we got 30,000 ticks in 15 minutes, we could handle it."

WALTER RAQUET
HERZOG, HEINE, GEDULD

of the stock crash was program trading. On Oct. 19, arbitrage and straight-sell programs triggered $4 billion in sales — 20% of the sales on the first 600-million-share day in the NYSE's history.

The commission report, filed in January, identified widespread selling pressures on the CME's commodities market as the start of the slide. Within hours, index arbitrage traders had placed $1.7 billion worth of program sales through the NYSE's Designated Order Turnaround system. An additional $2.3 billion in straight program sales, much of it from portfolio insurance accounts, was triggered by the prospect of deep discounts offered by the risk arbitrageurs.

From noon to 2 p.m., the Dow Jones industrial average fell from 2,140 to 1,950, with the last 100 points of the decline triggered by reports that the NYSE might close under the pressure of high-volume trading. By early afternoon, portfolio insurers had, the Brady Report said, "contributed over $3.7 billion in selling pressure."

Indeed, most exchange computer systems did have trouble handling the volume. The NYSE's SIAC system, comprising 200 Tandem CPUs, lost two processors under the strain — but the fault-tolerant system kept going. At times, the Pacific Stock Exchange's front-end processors stopped functioning altogether, halting trading for several hours. Everywhere, high I/O rates slowed the display of what was happening in real time on the exchange trading floors.

The fact that the worldwide stock markets are linked electronically did not contribute significantly to the worldwide reverberations from the crash but could become more important in the near future, according to Mark Smith, former vice-president of technology at the American Stock Exchange and current securities industry director at Stratus Computer, Inc.

For instance, Smith said, there could be an increase in the use of multinational brokerage houses and multinational links to make trades between countries. He also predicted that there will be more desire to access and trade foreign securities, with more U.S.-based investors seeking to buy securities in Japan, Britain and other countries as trade regulations ease up. The computer systems will play a major role in tracking trading behaviors and keeping the trading process smooth.

More is less?

The ability to access more stocks and handle more trading worldwide as the systems and links are improved, however, should not mean that another market drop would bring even more problems, cautioned former NYSE Chief Economist Roger Kubarych. "Because you have a lot of orders transmitted doesn't mean there will be big price effects," he said. In fact, he added, with less chance for bottlenecks, both buyers and sellers will have accurate information, which would be more likely to keep the market in check.

With the NYSE inundated with trading on Black Monday, the fact that the regional exchanges made it through that date relatively unscathed has been largely overlooked. The re-

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Tech stocks on ropes

Since knocking the computer industry to the ground last Oct. 19, the stock market has continued to kick sand in its face.

With few exceptions, computer stocks have failed to significantly recover from their market crash beating. Some, including former stock market darlings Digital Equipment Corp. and Lotus Development Corp., are now trading well below their closing price on Black Monday.

Computer stocks did not burn investors much worse than any other industry's stocks during the crash, but analysts trace the technology disfavor to broader changes in the investing climate. Small investors, many enamored with low-priced technology issues, were scared out of the market by the crash.

"Institutional investors are more powerful than ever before," said Richard Shaffer, president of consulting firm Technologic Partners in New York. "That exaggerates the tendency to buy large blocks of big companies, where you can't make waves because the pool [of outstanding shares] is so big."

Shaffer notes that most of the big market action has moved back to takeover speculation, which has not swept through the computer industry yet. "Fundamentals have less to do with stock prices than ever before," he said. "A dog of a widget company is a good target, so its stock soars. Apple and Microsoft are solid companies leading their industries, so there's no way they would be targets, and their stocks suffer."

Uncertainty about macroeconomic conditions, which has abated little since the crash, has translated into investor doubts about corporate spending for computers. Add in other uncertainties about the future of Unix, OS/2 and IBM's Micro Channel Architecture, and investors get downright catatonic.

"It's pretty simple," said Mary McCaffrey, a computer industry analyst at Cyrus J. Lawrence, Inc. "Everybody hates them, and no one wants to own them. Institutional fund managers are very near-term performance oriented because that's how they're evaluated. They just kick [technology stocks] out of their portfolios and wait for the volatility to settle down."

CLINTON WILDER

Comeback falls short

Major computer stocks have failed to reach their precrash price levels

	Oct. 16 1987	Oct. 19 1987	Oct. 12 1988
IBM	135	103¼	117½
DEC	172¼	130	90½
Microsoft	64½	45¼	50⅝
Lotus	32¼	26¼	15¼
Apple	48¼	36½	38¾
Compaq	62¼	49¼	52
Unisys	38	30½	31⅛
Computer Associates	28¼	21¼	28¾

CW CHART

The daily acid test

NYSE floor puts systems through their paces

NEW YORK — The floor of the nation's largest stock exchange is a constant proving ground for the computer systems that are designed to keep it running without a hitch.

"There is testing going on around here virtually the first and second shift of every single day of the week, on most Saturdays and occasionally on Sundays," said Geri DiCostanzo, the Securities Industry Automation Corp. (SIAC) senior vice-president in charge of New York Stock Exchange trading systems development and operations. SIAC is two-thirds owned by the NYSE.

Aside from the routine diagnostic and quality assurance tests on the Tandem Computers, Inc. and Stratus Computer, Inc. hardware systems, there are also many upgrade checks. For major software releases, tests are performed that involve NYSE workers as well as the floor of the exchange, DiCostanzo said.

Occasionally, there are the tests that put the NYSE's systems into the public eye. After last year's unprecedented market break in October, which slowed the systems at the exchange, the NYSE is trying to regain investor confidence by conducting periodic simulations to demonstrate that upgrades to its systems will let the exchange efficiently handle another Oct. 19.

Unprecedented traffic

The simulation testing in itself is not new, however. "We've been doing that for five or seven years on a regular basis," said Richard Torrenzano, senior vice-president at the NYSE. But because

all of the capacity-planning studies for the exchange, which are based on historical high-day data, showed that the maximum daily share-capacity level would reach 450 million by the end of 1987, tests had not been conducted at the 600-million-share level.

In the capacity-planning model, no 600 million-plus share days were expected until 1990, DiCostanzo said.

This year's first industry-related simulation testing was held on April 30 and involved more than 600 people. "We actually had the whole floor manned with specialist clerk firms, NYSE personnel and SIAC operations people," DiCostanzo said. Invited to witness the feat were the press and officials of the General Accounting Office and the Securities and Exchange Commission.

The test was conducted by replaying the actual data from Oct. 19, and the upgraded systems ran "without any problems whatsoever," DiCostanzo said.

ALAN J. RYAN

Higher stakes

Most of the New York Stock Exchange's volume and index records have been set in the last 12 months

Volume (in shares)		
Record day	608,148,710	Oct. 20, 1987
Record week	2,299,584,400	Oct. 28, '87*
Slowest day	31	March 16, 1830

Dow Jones industrial average		
Record close	2,722.42	Aug. 25, '87
Biggest one-day drop	508 points	Oct. 19, '87
Biggest one-day increase	186.84 points	Oct. 21, '87
Biggest weekly drop	295.98 points	Oct. 23, '87*
Biggest weekly increase	114.86 points	June 3, '88*

* Week ended

SOURCE: NEW YORK STOCK EXCHANGE, INC.
CW CHART

Black Monday

gionals helped ease the NYSE's burden somewhat.

"One-third of all trades that occurred on that day occurred away from the NYSE, within the regional systems," the Boston Stock Exchange's Coleman pointed out. "To have the regionals come in, step up to the plate and take that overload was a significant factor in the markets sustaining and maintaining themselves over those days," she added.

Ironically, it was a lack of automation that enabled the Boston exchange to fare better than some of the other regionals under the load. The exchange handled many of the orders manually and avoided the queuing problems some of the other exchanges incurred, Coleman said. The manual system can create backlogs, but not within the system.

And at the American Stock Exchange, the system limits of 55 million to 60 million shares a day were never reached. "The most we had to deal with during the crash was about 45 million," a spokesman said. Fortunately for the exchange, the software had been upgraded just the weekend prior to Oct. 19.

But those who made it through with few scars have not been resting comfortably. "I use the rule of thumb that the next peak will be 50% higher than the last," said Olaf Kraulis, vice-president of the Toronto Stock Exchange. In Toronto's case, Kraulis correctly called that jump.

In 1986, Toronto, which handles 75% of Canada's stock transactions, logged 25,000 stock trades on its busiest day. The peak for 1987 came Oct. 21: 35,000 trades totalling $420 million (Canadian) in sales. Kraulis said he expects the next peak to top 60,000 trades.

The Toronto exchange is already preparing to handle 70,000 to 80,000 trades. "We took steps in early 1987 to augment our capacity, and we're adding even more capacity now," Kraulis is planning to trade out his Digital Equipment Corp. VAX computers for a high-transaction, fault-tolerant system yet to be purchased — or selected.

Spooling up

The Boston Stock Exchange has completed installation of its Stratus-based Beacon system. "The advantage to Beacon is its fault-tolerant hardware and modular design, so the ability for us to add capacity as needed can be done very quickly," Coleman said.

And the exchange also has a redundant fallback system just in case. Since late last year, the Boston Stock Exchange has increased its nonautomated capacity of about 10 million shares a day to 20 million shares a day.

At the American Stock Exchange, a new trading room was opened in February that uses touch-screen systems to report the trades. The touch screens "have cut reporting time from 30 seconds to 15 seconds or less to actually record a trade," the spokesman said.

Much of the blame for the downward spiral of the market on Oct. 19 was placed on program trading.

"The book is still out on whether program trading was a cause for the crash," Stratus' Mark Smith said. "Even if you do away with program trading, that doesn't do away with the ability of the market to have a very serious correction or crash." After all, there was no technology in use in 1929 except for the telephone.

The day MIS will never forget

One year later, the stock market crash continues to haunt MIS departments, particularly in the New York area.

"I would think all retail brokerage firms have been affected by the reduction in volumes on the [New York Stock Exchange]," said W. H. Anderson, chief information officer and executive vice-president at Prudential-Bache Securities, Inc.

Some companies have had layoffs, and others have cut staff by attrition. In the greater New York metropolitan area alone, it was estimated that the number of computer professionals laid off by New York securities firms and banks in the weeks following Oct. 19 was in the range of 14,000 [CW, Jan. 25].

One MIS job recruiter said it may be as late as the third quarter of 1989 before the hiring slowdown in MIS picks up in New York.

According to Lynda Laurencin at Robert Half of New York, Inc., the market break left many New York-area MIS professionals out of work: "This is probably the worst depression I've ever seen in the 15 years I've been in this industry in the city." In the greater New York area, she estimated, there are probably more than 500 MIS managers seeking new positions.

The result? New York is now a buyer's market, Laurencin said. "We have tons of people at every level, especially management and senior people," she said. Within New York City alone, Laurencin added, her firm has seen approximately 300 high-level MIS managers looking for work.

Expendable

Faring even worse, she said, are the MIS consultants. "After the crash, everyone got rid of their consultants first," and many companies are reluctant to hire former consultants to full-time posts, fearing they will go back to consulting if the market rebounds, she said.

In Boston, the stock market crash hit hardest at Fidelity Investments, which laid off 800 employees in February.

Recruiters in the Washington, D.C., and Philadelphia areas reported seeing a flurry of resumes from New York following Oct. 19, but they said the break in the stock market did not have a negative impact on firms in those areas.

MIS hiring at San Francisco-area brokerage houses slowed briefly in the weeks after Oct. 19 but has been increasing over the last four or five months, according to Joe Laudari of The Search Firm, Inc.

ALAN J. RYAN

October 19, 1987

I remember looking out of my office, looking down Wall Street. Usually by 5:00 or 5:30, that's a very, very busy street. It was the most eerie evening because there was nobody on the streets. Everyone was just fighting their way through the aftermath.
Linda Coleman, former vice-president, NYSE

My overwhelming concern was the economy as a whole and what [the crash] would mean to all of the financial institutions on Wall Street.
Geri DiCostanzo, senior vice-president, Securities Industry Automation Corp.

It was exciting. We would love to see volume like that again soon — in a positive light.
W. H. Anderson, CIO and executive vice-president, Prudential-Bache Securities, Inc.

It felt like the market was in a free-fall. It felt like the world was coming to an end. If the Dow had fallen another 500 points, it would have been catastrophic.
Walter Raquet, senior vice-president of marketing and new products, Herzog, Heine, Geduld, Inc.

As a result of the crash, people have been slower to move their money into equities, and they've been slower to trade.
Jim Stoddard, senior vice-president, Fidelity Software Development Co.

By noon, it was clear that we had traded more shares in one day than any day in history, and we had several more hours to go...
Richard Torrenzano, senior vice-president, NYSE

Users get an SNA breather

BY ELISABETH HORWITT
CW STAFF

Corporate information systems managers heaved a sigh of relief last month as IBM fulfilled its promise to ship communications software that promises to make Systems Network Architecture (SNA) networks easier to manage and a lot more flexible.

"We got a little impatient waiting," said David Siegel, manager of network support at Chemical Bank.

A lot of IBM host-networking troubles will go away, users said,

now that their companies can install Advanced Communications Facility/Network Control Program (ACF/NCP) Version 4, Release 3, announced by IBM in January, and ACF/VTAM Version 3, Release 2, announced in June 1987.

For example, IBM expanded the SNA subarea addressing limit from 255 to 65,000 nodes in the nick of time for Sears Communications Co., which was running out of addresses, according to Vice-President Gary Weis.

The long-term beneficiaries of IBM's extended addressing

capability will be firms that implement IBM 9370s as departmental processors, said David Passmore, a principal at Network Strategies, Inc. in Fairfax, Va. Since the 9370 must be addressed as a subarea unto itself, users that have hundreds of remote sites will rapidly exceed the 255-node limit, he added.

Dynamic demand

One feature of the VTAM and NCP releases that IS managers have been demanding from IBM for years is dynamic reconfiguration of routing and path tables on communications controllers. With the older releases, "if we want to fix a problem routing sessions from one host to another, we have to bring VTAM down on both hosts," Chemical Bank's Siegel said.

"Sometimes we've had to wait a week or two for a good time to fix the table because it would disrupt the entire network," Siegel added. With the new release, "you just go dynamically in and make the update without disrupting any sessions at all, which makes support a whole lot easier."

Siegel also praised a VTAM enhancement that allows him to shift ownership of the SNA network from one host to another with a single command to NCP. With the older version, users

would have to log onto their applications all over again, he said.

The Travelers Corp. has been waiting eagerly for this support, which finally will allow the company to move from a hierarchical personal computer-to-host structure to an "equalized environment where any intelligent workstation can talk to any other" without having to go through the host, said Vincent Dellolio, second vice-president of data processing at Travelers.

While the enhanced NCP and VTAM releases make SNA peer-to-peer networking feasible, IBM still needs to write some application software for those protocols before they really catch on among corporate users, said Steven Randesi, co-founder of Saratoga, Calif.-based research firm Gen2 Ventures. The vendor just announced Distribution Manager, an LU6.2-based application that distributes microcode down to IBM 3174 controllers and should shortly distribute software updates to other IBM systems such as the Personal System/2, Randesi said.

Travelers received an early copy of the VTAM and NCP releases in February, so it has had plenty of time to try the software out, Dellolio said. "The new VTAM is incredibly stable and efficient — we expect it to save us $250,000 a year just in CPU cycles, and we see about a 40% reduction in resources needed for logging on and off."

No host needed
New SNA software lets PU2.1 devices communicate without host intervention

SOURCE: HOST INTERVENTION
CW CHART

Shortcutting
FROM PAGE 1

man mind is hard to replace in terms of looking at contingencies and being able to say that if you build a node there, this will happen to your response time," he said.

Users who have tried older network simulation packages complained that it takes too much time to come up with the complete and current information needed to ensure accurate results.

Tom McDonald, principal consultant at MGT Technology Group in Natick, Mass., recently used Connections, a package

from Connection Telecommunications, Inc., to do capacity planning for a major public network project. While praising the package's response-time analysis, McDonald complained about the amount of data entry it required. "I couldn't even ask it to copy over information about one site into another, similar site," he said.

Avon complaint

Data collection is the biggest problem connected with network simulation at Avon Products, Inc., according to Philip Colaluca, a network project leader at Avon. His staff has been investigating the modeling capabilities of IBM's recently announced

Transmission Manager, a Personal System/2-based system for NET switches.

"You can do network planning scenarios such as, 'If I route all my traffic through Chicago, how will it impact New York traffic?'" Colaluca said. Avon also uses Mind, a network simulation package developed by Contel Corp.

No matter what package is used, however, "you only get input as good as you put in," Colaluca said. His people tend to add more bandwidth than their simulations indicate is necessary, "because we'd rather have too much than too little. But when you allow that margin for error, what you're doing isn't really sci-

entific," he said.

The data entry problem is at least partly addressed by two recently announced software packages: IBM's Network Design Aid for MVS and Make's Netool Workbench. Both offerings are said to collect up-to-date network routing and node configuration data from the network system itself.

IBM's Design Aid obtains data about Systems Network Architecture networks through interfaces with IBM's Network Control Program and VTAM tables; Make's Netool Workbench finds out about T1 network configurations through the switch vendor's network management system. It also includes a database of carrier tariffs, regularly updated by the vendor. NET will sell the first release of the product, tailored to its own T1 offerings.

Since Prodigy uses NET switches, Mattera was interested in NET's version of Netool Workbench. However, he questioned whether it could provide all the data he needed for his decision making.

"A primary objective of network design is to avoid vulnerable routes," Mattera said. Still, Mattera said that he would investigate Netool Workbench. "That's why I come to the show — to look at tools like this."

Bright spot in IBM earnings

BY CLINTON WILDER
CW STAFF

ARMONK, N.Y. — IBM last week reported only meager growth in sales and earnings for the third quarter ended Sept. 30, but analysts were quick to see a silver lining — much of it due to Silverlake, or the Application System/400.

Considering that the three-month period was a major transition in the IBM product line at both the high end and in the mid-range, IBM's revenue growth of just 5% was considered adequate.

But most encouraging was an estimated 20% growth in orders placed by IBM's U.S. customers during the quarter, according to mainframe analyst Michael Geran at Nikko Securities in New York.

"In terms of future results, we finally have evidence of a turn in orders in the U.S. and continued strength overseas," Geran said. "It was an impressive order quarter."

Late starter

With shipments of its AS/400 and 3090 S models not beginning until late in the third quarter, the quarterly results reaped only a small benefit from those products.

However, overall IBM shipments were ahead of year-earlier levels for the seventh consecutive quarter, IBM Chairman John Akers said in a prepared statement.

Overall, IBM earned $1.25 billion in the quarter, a 3% increase over year-earlier profits of $1.21 billion. The organization's earnings per share came in at the high end of Wall Street analysts' prediction ranges at $2.10, compared with $2 per share a year earlier.
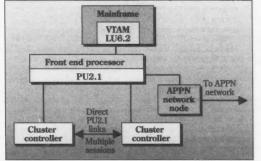
According to IBM, during the first nine months of 1988, its profits were 9% ahead of 1987's, but that was mainly attributable to a lower effective tax rate. Pre-tax earnings, which grew 5% in the third quarter, were still 3% below 1987 levels for the nine-month period.

Third-quarter revenue increased 5% to $13.4 billion, compared with $12.73 billion in the year-earlier period. Nine-month sales of $38.74 billion were 7% higher than in the first nine months of 1987.

In a product line breakdown, third-quarter revenue from systems sales increased 7%, and software revenue grew 12%, compared with the third quarter of 1987.

TRENDS

Engineering

Who will buy into engineering data management?

POTENTIAL NUMBER OF UNITS INSTALLED BY 1992

1,500	1,500	1,200	600	600	1,600
Aerospace/ Defense	Automotive	Electronic/ Electrical	Machinery	Consumer products	Other

C omputer-aided design (CAD) technology revolutionized manufacturing, but with it came a new set of problems: how to manage all those computer-generated drawings and models.

A new class of software, dubbed computer-integrated product and program information management (CIP/PIM) by Cimdata, Inc. in Wellesley, Mass., manages the information on a product from engineering through manufacturing. It tracks various data related to a product, such as drawings and revisions, throughout the product cycle.

Not surprisingly, the aerospace and automotive industries will make up the largest users of this CAD management software, according to Cimdata. Companies in these industries are the heaviest users of CAD and have the most complex systems.
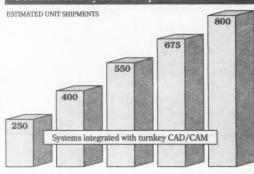
Packaged systems for tracking CAD documents are fast replacing homegrown engineering data management systems.
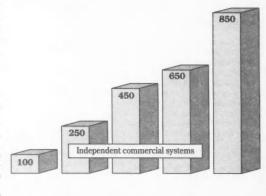
Vendors of these products include such heavyweights as IBM, Digital Equipment Corp. and Prime Computer, Inc. as well as the emerging class of specialized vendors such as Sherpa Corp.
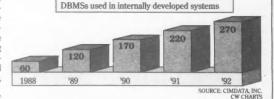
While the product implementations can take many forms, most integrate database management systems as a core piece of the software. Relational technology lends itself well to the task of establishing and tracking relationships between the various elements of a drawing and relating them to other areas, such as bill of materials.

AMY CORTESE

Commercial system shipments to soar

ESTIMATED UNIT SHIPMENTS

250	400	550	675	800	

Systems integrated with turnkey CAD/CAM

100	250	450	650	850

Independent commercial systems

DBMSs used in internally developed systems

60	120	170	220	270
1988	'89	'90	'91	'92

SOURCE: CIMDATA, INC.
CW CHARTS

Get good and SCSI. DEC is expected to add two new models to its Microvax line Wednesday. According to a source close to the program, DEC will introduce the Microvax 3300 and 3400 to fill a gap between the Microvax II and Microvax 3500 and 3600. The newest members of the family will run on the 2.8-MIPS CVAX processor and will be packaged in a smaller pedestal than the Microvax II. In addition, DEC is expected to introduce a new mass-storage interface for the Microvaxes called DSSI. Our source called the interface DEC's proprietary implementation of the industry-standard small computer systems interface.

For the techie on your Christmas list. For once, it seems, a microcomputer software program will be on time. Word last week was that the OS/2 Presentation Manager (that's Pman for short) was scheduled to ship the very last day it could and still remain on time. Look for Pman to start shipping Oct. 31, with a major unveiling by IBM that day — or Nov. 1 at the latest. IBM says the software is on time, and coauthor Microsoft says, "See you later this month."

Users enrolled in IBM's early support program will begin getting a late beta-test version of OS/2 Extended Edition with Pman starting this week. What we probably won't see is support for output devices, and we'll get only scant support for monitors and other peripherals.

We don't mind waiting, but we're getting hungry. To be sure, it's just a matter of time. Rumors were rife last week that IBM is gearing up to announce both that its 16M bit/sec. Token-Ring is shipping and that it will support the Named Pipes application programming interface (API) under Microsoft's OS/2 LAN Manager. But when? Some sources were sure IBM would make these pronouncements tomorrow, others predicted that Oct. 25 will be the day, and still others anointed IBM's anticipated mid-November shipment of the LAN Server as the perfect time and place. IBM passed up a golden opportunity to bless LAN Manager while attending a joint 3Com-Microsoft press conference on LAN Manager last week (see story page 4). So despite being a coup, timing that announcement tomorrow would probably annoy Microsoft. Just three weeks ago, IBM said the high-speed Token-Ring was still mired in internal testing, and since the LAN Manager API is embedded in LAN Server, November makes the most sense.

Psst . . . Wanna buy a plug-compatible manufacturer? Two strikes and you're out. National Semiconductor may be fed up with the last couple of quarters' poor earnings for National Advanced Systems. It's just a rumor, but financial types are saying that National Semi may put NAS on the block.

Maybe slides of Jim Manzi's vacation? It seems that the executives who arranged Lotus' recent, hastily called press conference to explain away the latest in what seems to be a terminal series of delays concerning the next release of Lotus 1-2-3 forgot to sound the alarm internally. Some users in the Boston area are no doubt chuckling over notices they received from Lotus last week offering them the chance to sign up for scheduled demos of Release 3.0. The question is, what is Lotus planning to show them?

What if — we use a modem? Unisys subsidiary Timeplex claims that it plans to make its Link/Design network simulation service available as user software at an undisclosed future date. Users visiting a Timeplex sales office can play what-if games to determine which configuration of Timeplex switches and carrier tariffs meet their needs.

Fear and loathing in New York: At last week's Info '88 show, you could wander down the aisles and view full-color demos of 1-2-3 Release 3.0 (announced April 1987); Dbase IV (announced last February); OS/2 Extended Edition (announced in April '87) and Presentation Manager (announced in April '87). You can't buy a single one of them yet. And they wonder why trade show attendance is down. If you want to swap tips and tip-offs with someone who is real, call the CW hot line at 800-343-6474 or 508-879-0700 and ask to speak to Editor Bill Laberis, sitting in for vacationing news monger Peter Bartolik this week.